

HELMINTHOLOGICAL ABSTRACTS

incorporating
BIBLIOGRAPHY OF HELMINTHOLOGY
COMPILED FROM WORLD LITERATURE OF 1956



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HELMINTHOLOGICAL ABSTRACTS

INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1956

Vol. 25, Part I

1—Acta Parasitologica Polonica.

- a. JEZIORAŃSKA, A., 1956.—“Wartość diagnostyczna antygenów trichinellowych przy włośnicy.” 3 (6/12), 191–215. [English & Russian summaries pp. 214–215.]
- b. PROST, E., 1956.—“Występowanie inwazji pasożytniczych u zwierząt rzeźnych w Polsce.” 3 (6/12), 217–231. [English & Russian summaries pp. 228–231.]
- c. JANISZEWSKA, J., 1956.—“*Rhabdochonos barbi* g.n., sp.n., subfamily Rhabdochonoidinae subfam. n. (fam. Rhabdochonidae Skrjabin), an intestinal parasite in cyprinid fish.” 3 (6/12), 233–244. [Polish & Russian summaries pp. 243–244.]
- d. KOZAR, Z. & SZYMAŃSKA, H., 1956.—“Epidemiologiczne badania nad pasożytami jelitowymi wśród chorych szpitala psychiatrycznego.” 3 (6/12), 245–260. [English & Russian summaries pp. 257–260.]
- e. GŁUSZKOWSKA, A., 1956.—“Robaki pasożytnicze przewodu pokarmowego kotów w Łodzi.” 3 (6/12), 261–268. [English & Russian summaries pp. 267–268.]
- f. KOZAR, Z. & SZYMAŃSKA, H., 1956.—“Przyczek do częstości występowania pasożytów jelitowych u dzieci wiejskich w woj. gdańskim.” 3 (6/12), 269–278. [English & Russian summaries pp. 277–278.]

(1a) In a detailed investigation of the diagnostic value of trichina antigen, Jeziorańska found that the precipitin test in 58 infected persons was positive in 92% and non-specific in 13% of 71 test sera. Complement fixation at 37°C. in 96 cases of trichinosis was positive in 82% and non-specific in about 8% of 71 test sera and at cool room temperature 92% of 74 infected cases were positive and non-specific in 9% of 74 test sera. In microprecipitation reaction with live *Trichinella* larvae about 70% of 78 cases were positive and there were no non-specific reactions in 35 test sera. Precipitins appeared in the sera of trichinosis cases on the 21st to 25th day of illness and complement fixing antibodies at the end of the fourth week after the onset of clinical symptoms.

R.T.L.

(1b) Statistical data for 1949–53 from slaughterhouses of 10 major towns in Poland are based on official bulletins and give for each town the incidence of, and resulting losses from, trichinellosis, cysticerciasis and echinococcosis in pigs, cysticerciasis and fascioliasis in cattle and fascioliasis and echinococcosis in sheep and goats. As the data are based on heavy infestations of internal organs only, the actual incidence of these infections is probably several times higher.

R.T.L.

(1c) Some nematodes from *Barbus barbus* and *B. meridionalis petenyi*, collected by Janiszewska from the rivers Wisła and Odra, were provisionally classified as belonging to Cystidicolinae on account of the structure of the eggs but on examination of their anatomy seemed typical of Rhabdochoninae. Three species of *Rhabdochona* also possess characters which place them in an intermediate position between *Rhabdochona* and *Cystidicola*. For these and for her new find Janiszewska creates a new subfamily Rhabdochonoidinae which she defines as having a fine thread-like body and a smoothly ending lipless head, a cup-shaped mouth cavity with chitinous ridges set with denticles along the edges, an oesophagus with well differentiated muscular and glandular parts, two unequal and differently formed spicules, no gubernaculum and eggs with filaments. These characters are also used for her new genus

Rhabdochonoidea into which she brings *R. filamentosa*, *R. ovifilamenta* and *R. sulaki* from the genus *Rhabdochona* and adds *R. barbi* n.sp. [which she describes and figures but does not specifically differentiate]. R.T.L.

(1d) Psychopathic hospitals in Poland are specific centres of parasitic infection. The incidence of *Enterobius vermicularis* ranged from 22.7% to 80.2% in wards located in separate buildings and was highest in those for chronic patients. Soil samples from the garden of the most heavily infected ward gave the highest number of *Ascaris* eggs. R.T.L.

(1e) The low incidence of *Hydatigera taeniaeformis* in stray cats in Lodz is attributed to the systematic rat destruction carried out in the town, and the absence of trematodes to the lack of larger water reservoirs in the neighbourhood. R.T.L.

(1f) In the faeces of 1,063 peasant children, seven to fifteen years of age, in the district of Gdansk the helminth incidence was *Enterobius* 68.39% (reaching 75.33% in those eleven years old), *Trichuris* 10.29% and *Ascaris* 1.43%. R.T.L.

2—Acta Zoologica Mexicana.

- a. FLORES BARROETA, L., 1956.—“Nematodos de aves y mamíferos. I.” 1 (8), 1-9. [English summary p. 8.]

(2a) The occurrence of *Ancylostoma braziliense* and *Physaloptera* (*Physaloptera*) *maxillaris* in the armadillo *Dasypus novemcinctus mexicanus* in Mexico are reported. From the same host *Lauroia dasypi* n.sp. is described and figured. It differs from the three known species in having quadrangular plaques at the anterior end and in the number and arrangement of the caudal papillae in the male. R.T.L.

3—Agricultural Institute Review. Ottawa.

- a. FRANK, J. F., 1956.—“Advances in controlling internal parasites of live stock.” 11 (2), 62-64.
b. MOYNIHAN, I. W., 1956.—“The role of sanitation and disease control in successful live stock production.” 11 (2), 65-67.

(3a) Scientific investigation has revealed that certain drugs which have gained prominence in the past through common use are useless. Recent advances in the treatment and control of helminth infections in pigs, horses and sheep are summarized. The possibility that gastrointestinal parasites may play a significant role in cattle production is considered. R.T.L.

(3b) Moynihan briefly summarizes the chief types of parasitic disorders of stock and the various ways in which they can be controlled or eliminated by proper management coupled with adequate sanitation. R.T.L.

4—Agriculture. London.

- a. WEBB, F. W., 1956.—“Chemical sterilization of soil in glasshouses.” 62 (11), 526-529.
b. JONES, J. L., 1956.—“Taunton teasels.” 62 (11), 540-542.

(4a) While heat sterilization of soil to control pests and diseases in glass-houses is recognized as highly effective, the very high cost (£500 to £550 per acre) and lack of labour mean that chemicals are being used more. Amongst these, the use of D-D mixture, chloropicrin, ethylene dibromide and parathion for the control of *Meloidogyne* spp. and *Heterodera rostochiensis* is described. A table gives the relative costs of the different treatments. J.B.G.

(4b) In a general article on the cultivation and use of teasels the considerable damage (up to 50% loss) done by stem eelworm is mentioned. Infested plants are malformed and “cabbagey” producing soft useless heads. The pest has been propagated by the use of seed collected haphazardly. However, by selection of better seed, treatment with 0.5% chlorophenol for 20 minutes before sowing and good husbandry with long rotations if necessary a great measure of control has been effected. J.B.G.

5—American Journal of Hygiene.

- a. ROZEBOOM, L. E. & CABRERA, B. D., 1956.—“Filariasis in the Philippine Islands.” **63** (2), 140-149.
- b. TWOHY, D. W., 1956.—“The early migration and growth of *Nippostrongylus muris* in the rat.” **63** (2), 165-185.

(5a) There has been little change in the incidence of filariasis in the Philippines during the last fifty years. The endemic areas are usually those in which abaca is extensively cultivated and the infection rate in adult males is significantly higher than in females. *Aedes poicilius* is an important vector in these areas. No evidence was obtained that *Culex fatigans* was a vector for the periodic *Wuchereria bancrofti* of the Philippines. R.T.L.

(5b) From this detailed account of the migration and growth of *Nippostrongylus muris* it is concluded that after subcutaneous infection of larvae there is a lag in their growth during their 11-12 hours' stay in the skin. Most of the larvae reached the lung in 15 hours but over 30% were still in the skin after 18-19 hours and probably did not complete the migration. When the larvae were placed on the skin surface many did not penetrate for over an hour but after entry their migration to the lung took about the same time as those injected subcutaneously. The first larvae reached the gut about 41½ hours after infection and about 50% had done so in 45-50 hours. By 59 hours only 10% of the larvae were still in the lungs. R.T.L.

6—American Journal of Tropical Medicine and Hygiene.

- a. MACKIE, T. T. ET AL., 1956.—“Intestinal parasitic infections in Forsyth County, North Carolina. V. Prevalences of individual parasites.” **5** (1), 40-52.
- b. HSÜ, H. F. & HSÜ, S. Y. LI, 1956.—“On the infectivity of the Formosan strain of *Schistosoma japonicum* in Macaques.” **5** (1), 136-144.

(6a) In this survey in North Carolina the authors examined 1,934 schoolchildren, from schools selected to give a competent distribution by race and residence, for intestinal parasites. In addition 609 members of their families were examined. Except for *Enterobius vermicularis*, which occurred in 13.4% of the whites and 2.7% of the Negroes, the helminth incidence was low. There had been a marked drop in the prevalence of *Ascaris* and hookworm since surveys made in 1934 and 1937 and this is attributed to the fact that faecal soil pollution has been almost completely eliminated. The spread of protozoal infections has not been controlled. S.W.

(6b) Hsü & Hsü compared the infectivity of the Formosan strain of *Schistosoma japonicum* in *Macacus cyclopis* from Formosa, *M. fuscatus* from Japan and *M. philippinensis* from the Philippines with the infectivity of human strains of the parasite from Japan and the Philippines in Formosan monkeys. Each monkey was exposed to about 600 cercariae and daily stool examinations started on all monkeys 28 days after exposure. The degree of susceptibility of the monkey species to the strains of the parasite was ascertained by the length of the prepatent period, the number of eggs produced, the immature-mature egg ratio and the number of adult worms at autopsy. The Formosan monkeys were poor hosts for the Formosan strain of *S. japonicum*, the prepatent period varying from 35 to 98 days and, in the majority, the daily egg production being small. They were, however, highly susceptible to the Japanese and Philippine strains of the parasite. The Japanese and Philippine monkeys however were reasonably good hosts for the Formosan strain of *S. japonicum*. Although the data were incomplete in some instances and the number of animals used in some of the experiments was small, Hsü & Hsü conclude that the results support their previous suggestion that the Formosan strain of *S. japonicum* differs from the Japanese and Philippine strains. The final proof of the inability of the Formosan strain to infect man could only be obtained by exposing human volunteers. D.L.H.R.

6—American Journal of Tropical Medicine and Hygiene (cont.)

- c. TARIZZO, M. L., 1956.—“Schistosomiasis in Saudi Arabia. Treatment with lucanthone hydrochloride (nilodin) and with sodium antimonyl gluconate (Triostam).” 5 (1), 145-149.
- d. WILLARD, Jr., B. C., 1956.—“Fatal hematemeses in *Schistosoma mansoni* infection.” 5 (1), 150-157.
- e. STROHSCHNEIDER, H., 1956.—“Oral and intraperitoneal treatment of *Acanthocheilonema* (*Dipetalonema*) *perstans* with diethylcarbamazine.” 5 (1), 158-162.
- f. WALTON, B. C., TRAUB, R. & NEWSON, H. D., 1956.—“Efficacy of the clothing impregnants M-2065 and M-2066 against terrestrial leeches in North Borneo.” 5 (1), 190-196.

(6c) Tarizzo used lucanthone hydrochloride administered by mouth in three daily doses over a period of four to ten days to treat 24 cases of *Schistosoma mansoni* and four cases of *S. haematobium*. None of the *S. haematobium* patients developed symptoms considered to be due to the toxicity of the drug, but nausea, vomiting, epigastric pain, yellow discolouration of the skin or diarrhoea were experienced by some of the *S. mansoni* patients. In 6 out of 12 of the *S. mansoni* patients which were followed up cures were effected with dosages of 55-75 mg. per kg. body-weight. Only in the case of the *S. haematobium* patient who received 110 mg. per kg. body-weight was a cure effected. Tarizzo also used sodium antimonyl gluconate intravenously in four to six doses on consecutive or alternate days to treat 41 *S. mansoni* and 5 *S. haematobium* patients. There were no reactions to treatment in the cases of *S. haematobium* infection but nausea or vomiting, skin rash, pruritus coughing or low grade fever were experienced by some of the *S. mansoni* patients. 12 of the 18 cases of *S. mansoni* followed were cured with dosages of 13-21.6 mg. per kg. body-weight. All four cases of *S. haematobium* infection were cured with dosages of 20-24 mg. per kg. body-weight.

D.L.H.R.

(6e) Strohschneider confirmed the observations of a number of workers that diethylcarbamazine is by no means without some efficacy when administered orally against *Acanthocheilonema* (*Dipetalonema*) *perstans*. The only side effect observed during a course of treatment of 500 mg. per day for ten days was the usual urticaria-like skin reaction. He suggests that the success reported by numerous authors might be due to (i) a short duration of the infection or prevention of the development of the inflammatory barrier permitting a concentration of the drug sufficient to eradicate the filariae, (ii) the unreliability of tests carried out for less than four months since microfilariae can disappear from the blood and reappear even after a period of two months. These theoretical considerations led to the experimental intraperitoneal application of diethylcarbamazine via a rubber drain introduced under the omentum to the centre of the abdominal cavity. A 0.5% sterile solution of pure water-soluble powdered diethylcarbamazine was used for injection. 800,000 I.U. of penicillin were also administered daily. Two weeks after this treatment one patient relapsed but another who had received a combined oral and intraperitoneal course was presumed to have been cured since the blood remained negative for microfilariae after seven months.

D.L.H.R.

(6f) Walton, Traub & Newson investigated the efficacy of the clothing impregnants M-2065 and M-2066 against terrestrial leeches in North Borneo and compared their efficiency with M-1960 insect repellent which was known to give good protection against these blood-sucking annelids. Standard tropical kit was impregnated and washed once before the test and the effectiveness of treated socks alone as a means of protection for the scantily clad indigenous people was also investigated. Excellent protection was afforded by all three repellents, a maximum of one leech being found on protected individuals. After four washings M-1960 and M-2065 retained some of their effectiveness, but after six washings the treated clothing offered little additional protection. In the case of the natives wearing impregnated socks protection was excellent but little protection could be expected against leeches attached to vegetation above the knee-length socks. Walton, Traub & Newson conclude that these repellents would be of value to troops and to others whose activities exposed them to the attacks of terrestrial leeches.

D.L.H.R.

6—American Journal of Tropical Medicine and Hygiene (cont.)

- g. BURROWS, R. B. & SWERDLOW, M. A., 1956.—“*Enterobius vermicularis* as a probable vector of *Dientamoeba fragilis*.” 5 (2), 258–265.
- h. WELLS, W. H. & BLAGG, W., 1956.—“A survey of human intestinal parasites in a fishing village of northern Egypt.” 5 (2), 266–268.
- i. FIGUEROA M., H. & AGUILAR, F. J., 1956.—“The first case of *Dipylidium caninum* found and identified in a human being in Guatemala.” 5 (2), 269–271.
- j. KUNTZ, R. E., 1956.—“Evaluation of sodium-pentachlorophenate as a molluscicide in Egypt.” 5 (2), 274–285.
- k. KLOCK, J. W., 1956.—“A field technique for quantitative estimation of the molluscicide sodium pentachlorophenate based on fish mortality rates.” 5 (2), 286–289.
- l. OLIVER-GONZÁLEZ, J., BAUMAN, P. M. & BENENSON, A. S., 1956.—“Effect of the snail *Marisa cornuarietis* on *Australorbis glabratus* in natural bodies of water in Puerto Rico.” 5 (2), 290–296.
- m. CHERNIN, E., MICHELSON, E. H. & AUGUSTINE, D. L., 1956.—“Studies on the biological control of schistosome-bearing snails. I. The control of *Australorbis glabratus* populations by the snail, *Marisa cornuarietis*, under laboratory conditions.” 5 (2), 297–307.

(6g) Dobell's hypothesis that *Dientamoeba fragilis* is transmitted in the egg of a nematode is supported by the finding of small bodies, 2–3 μ in diameter, in many eggs of *Enterobius vermicularis* in sections of the appendix of a patient known to harbour *D. fragilis*. R.T.L.

(6h) In the relatively isolated Egyptian fishing village of Baltim on the north-east shore of Lake Burullus, the incidence of helminth eggs in the faeces of 367 children, based on a single stool examination by sedimentation, was: *Ascaris lumbricoides* 50%, *Heterophyes heterophyes* 36%, *Schistosoma mansoni* 34%, *Ancylostoma duodenale* and *Trichuris trichiura* 16%, *Hymenolepis nana* 15%, *Schistosoma haematobium* 6% in faeces (urine not examined), *Enterobius vermicularis*, *Strongyloides stercoralis* and *Hymenolepis diminuta* 2% and *Taenia* sp. 1%. The schistosome vectors *Biomphalaria boissyi* and *Bulinus contortus* were collected from the principal canal at the edge of the village. R.T.L.

(6j) From a series of tests in semi-balanced tub aquaria and in the field Kuntz concludes that in irrigation waters in Egypt sodium pentachlorophenate should be applied at the rate of 15–20 p.p.m. and should be maintained for 12, or better 20 to 24, hours to ensure efficient year round control of the *Bulinus* and *Biomphalaria* vectors of schistosomiasis. His data show a lower molluscicidal and ovicidal action than reported for *Australorbis*. The chemical is very toxic to fish even at 6 p.p.m. in irrigation canals but aquatic plants were not seriously damaged. Differences in local temperature, organic debris and vector species may explain the differences in the results obtained in other countries. R.T.L.

(6k) A quantitative estimate of the amount of sodium pentachlorophenate in treated waters was reached by comparing the mortality rates of the guppy fish *Lebistes reticulatus* in natural water to which a specific amount of the molluscicide has been added and water containing an unknown amount. A chart gives representative standard semi-logarithmic mortality curves for doses ranging from 2 p.p.m. to 25 p.p.m. The method gives results which can be relied on for effective use against molluscan vectors of schistosomiasis. R.T.L.

(6l) A flourishing colony of *Australorbis glabratus* in the San Anton Creek has been under close observation since 1947 in connection with *Schistosoma mansoni* investigations. In 1952 the mollusc *Marisa cornuarietis* appeared in large numbers for the first time and *A. glabratus* disappeared. The interrelationship of the two species and the possible use of *Marisa cornuarietis* for the control of schistosome vectors is discussed. R.T.L.

(6m) Laboratory aquaria studies were undertaken to ascertain the mechanism by which *Marisa cornuarietis* reduced populations of *Australorbis glabratus*. This large ampullarid snail is not a predator. It is a voracious herbivore. When feeding on vegetation it ingests the egg masses of *A. glabratus* deposited thereon. It also destroys the newly hatched snails. R.T.L.

6—American Journal of Tropical Medicine and Hygiene (cont.)

- n. CHERNIN, E., MICHELSON, E. H. & AUGUSTINE, D. L., 1956.—“Studies on the biological control of schistosomiasis-bearing snails. II. The control of *Australorbis glabratus* populations by the leech, *Helobdella fusca*, under laboratory conditions.” 5 (2), 308–314.
- †o. KAGAN, I. G. & BARGAI, U., 1956.—“Serological studies in experimental trichinosis.” 5 (2), 380.
- †p. SCOTT, J. A., MacDONALD, E. M. & OLSON, L., 1956.—“Attempts to produce immunity against the filarial worms of cotton rats by transfer of developing worms.” 5 (2), 380–381.
- †q. KESSEL, J. F., THOORIS, G. C., BONNET, D. & KERREST, J., 1956.—“A program for the control of filariasis.” 5 (2), 381.
- †r. OLIVER-GONZÁLEZ, J., 1956.—“Artificial immunization against *Ascaris lumbricoides*—protective action of embryonated egg antigen.” 5 (2), 381–382.
- †s. HOEKENGA, M. T., 1956.—“Treatment of ascariasis with piperazine citrate alone and in combination with other anthelmintic agents.” 5 (2), 382.
- †t. BUEDING, E. & FARROW, G. M., 1956.—“Isolation of succinic acid from the perienteric fluid of *Ascaris lumbricoides*.” 5 (2), 382.

(6n) Under laboratory conditions the leech *Helobdella fusca* is capable of greatly reducing the numbers of an *Australorbis glabratus* population. Snails of all sizes were killed but the small ones were especially vulnerable. R.T.L.

(6o) In the sera of rabbits experimentally infected with *Trichinella spiralis* positive haemagglutination was detected by Boyden's test six to ten days after infection. Precipitin ring tests were positive 20 to 42 days after infection. Double diffusion tests with Melcher's acid-soluble larval antigen against immune rabbit serum indicated at least three antigen-antibody systems in the agar. R.T.L.

(6p) From experiments on cotton-rats with *Litomosoides carinii* it was concluded that the immunity expressed by retarded development is produced by young developing worms. R.T.L.

(6q) A standard programme is suggested for the control of filariasis in French Oceania by the combined use of hetrazan as a microfilaricide and the institution of intensive control of the mosquito vectors *Aedes polynesiensis* by eliminating their breeding places within one hundred metres of each dwelling. Treatment of all current and originally positive cases should be continued until they have been negative for two years and mosquito control should be maintained after the microfilaricide programme has been discontinued. R.T.L.

(6r) Physiological saline suspensions of dry and powdered adults, uterine eggs and embryonated eggs of *Ascaris lumbricoides* were used to inject guinea-pigs intraperitoneally for three days. With four day intervals the injections were continued for a further five to seven weeks. A challenging dose of *Ascaris* eggs was injected ten to 30 days after the last immunizing dose and eight to ten days later the animals were autopsied. The lungs from those immunized with adult material and non-embryonated egg material contained large numbers of larvae and had the same haemorrhagic appearance as the controls. The lungs of those immunized with embryonated egg material contained few or no larvae and very few macroscopical lesions. R.T.L.

(6s) The combination of toluene or of activated papain with piperazine citrate gave little or no improvement over piperazine citrate alone in the treatment of ascariasis but when a single dose of 3 gm. of piperazine citrate with 0.6 gm. of hexylresorcinol was given to 68 children the rate of cure rose to 95% as compared with 90% in 37 children who received 3 gm. of piperazine citrate alone. R.T.L.

(6t) The respiration of helminth tissues is markedly stimulated by the body cavity fluid of *Ascaris*. The stimulating substance is heat stable and non-volatile and is identified as succinic acid. The concentration of succinate in the perienteric fluid varied from 5.3 to 12 micromoles per ml. R.T.L.

† Abstract of paper presented at the 4th Annual Meeting of the American Society of Tropical Medicine and Hygiene held at Boston, Mass., 2–5 Nov., 1955.

6—American Journal of Tropical Medicine and Hygiene (cont.)

- †u. SADUN, E. H., MELVIN, D. M., BROOKE, M. M. & CARTER, C. H., 1956.—“Evaluation of promethazine hydrochloride, RO2-5655/3 phthalylsulfathiazole, and piperazine hexahydrate in the treatment of enterobiasis in a mental institution.” 5 (2), 382-383.
- †v. SAWITZ, W. G. & KARPINSKI, F., 1956.—“Treatment of oxyuriasis with the cyanine dye POM-22 (‘Poquil’).” 5 (2), 383.
- †w. SADUN, E. H., 1956.—“Epidemiologic investigation of hookworm, *Ascaris*, and *Trichuris* in Thailand.” 5 (2), 383-384.
- †x. STERMAN, M. M. & SHOOKHOFF, H. B., 1956.—“Treatment of *Diphyllobothrium latum* infection with quinacrine (atabrine).” 5 (2), 384.
- †y. SHOOKHOFF, H. B. & STERMAN, M. M., 1956.—“Treatment of tapeworm infections with Priodax.” 5 (2), 384.
- †z. WOLFGANG, R. W. & POOLE, J. B., 1956.—“Distribution of echinococcus disease in northwestern Canada.” 5 (2), 384-385.
- †ba. COKER, C. M. & OLIVER-GONZÁLEZ, J., 1956.—“Studies on immunity to schistosomiasis—passive transfer of anti-egg antibody in humans.” 5 (2), 385.

(6u) Relatively high doses of piperazine hexahydrate and to a lesser degree phthalylsulfathiazole when administered for 14 consecutive days had a marked anthelmintic effect in children with *Enterobius vermicularis* infection. 21 out of 42 untreated controls were negative at the end of the trial period. The rates of spontaneous cure and the effectiveness of the drugs were correlated with the intensity of infection.

R.T.L.

(6v) The cyanine dye, 6-dimethylamino-2-[2-(2,5-dimethyl-1-phenyl-3-pyrryl)vinyl]-1-methylquinolinium chloride dihydrate, known as POM-22 or Poquil cured the 42 patients with enterobiasis so far treated. An aqueous suspension containing 0.5 mg. to 1 mg. per kg. body-weight was given three times daily for six days. There were no side effects. The swabs were positive for the first time on the 40th day after treatment.

R.T.L.

(6w) The incidence and intensity of infection with hookworm (43%), *Ascaris* (70%) and *Trichuris* (53%) in the southern provinces is higher than in other parts of Thailand. The faeces of about 25% of the hookworm cases showed over 10,000 eggs and 20% of those with *Trichuris* had over 10,000 eggs per gramme.

R.T.L.

(6x) Fourteen adults with *Diphyllobothrium latum* infection and 25 out of 31 with *Taenia saginata* were successfully treated by 0.8 gm. of quinacrine. The whole worm including the scolex was frequently expelled but half the patients had an attack of nausea and vomiting for four to five hours after treatment.

R.T.L.

(6y) Four of nine adults with *Taenia saginata* and two of five with *Diphyllobothrium latum* were successfully treated with 6 gm. of Priodax. Only in one instance was a scolex, that of *T. saginata*, recovered.

R.T.L.

(6z) Wolfgang & Poole report that surveys on the incidence of hydatid in the Indian population in northern Alberta and British Columbia and in the Northwest and Yukon Territories have been made with intradermal skin tests.

R.T.L.

(6ba) Serum from persons with *Schistosoma mansoni* infection and who gave a positive skin reaction to homologous egg antigen was injected into the skin of individuals with no history of infection. The same amount (0.15 ml.) of normal human serum was injected at a separate site; 48 to 72 hours later injections of saline extracted egg antigen (1:10,000) were made at the same sites and at an additional site where no serum had been injected previously; 15 to 20 minutes afterwards positive skin reactions occurred only where the immune serum had been injected. But no reaction was observed when these tests were made on infected individuals who gave a negative reaction to egg antigen. Thus anti-egg antibody can be passively transferred into non-infected individuals but appears to be neutralized by some factor, possibly a specific antigen in certain infected persons.

R.T.L.

6—American Journal of Tropical Medicine and Hygiene (cont.)

- †bb. WARNER, B. W., 1956.—“The role of the proctologist in the diagnosis of schistosomiasis mansoni by sigmoidoscopy and rectal biopsy.” 5 (2), 385.
- †bc. CHERNIN, E., MICHELSON, E. H. & AUGUSTINE, D. L., 1956.—“The effects of population density on growth and fecundity in *Australorbis glabratus*.” 5 (2), 385-386.
- †bd. PAYNE, E. H., GONZALES-MUGABURU, L. & SCHLEICHER, E. M., 1956.—“Intestinal parasite survey in the high Cordilleras of Peru.” 5 (2), 386.

(6bb) The procto-sigmoidoscopic picture of the mucous membrane of the rectum and sigmoid in cases of schistosomiasis mansoni is described. Microscopical examination of fresh unstained rectal mucosa for schistosome eggs is also of value in hospital and out-patient departments. R.T.L.

(6bc) The stunted growth and reduced fecundity which results from the overcrowding of *Australorbis glabratus* in aquaria is probably due not to chemical or physical changes in the water but to increased interference with the normal feeding and other habits of the individual snails. R.T.L.

(6bd) At Callejon de Huylas, a valley in Peru isolated by high mountains, *Fasciola hepatica* infection was found to be quite high in some groups of the static population. R.T.L.

7—Annals of Tropical Medicine and Parasitology.

- a. DUKE, B. O. L., 1956.—“The intake of the microfilariae of *Acanthocheilonema perstans* by *Culicoides grahami* and *C. inornatipennis*, and their subsequent development.” 50 (1), 32-38.
- b. HILL, J., 1956.—“Chemotherapeutic studies with laboratory infections of *Schistosoma mansoni*.” 50 (1), 39-48.
- c. MACLEAN, G., 1956.—“An experiment in the control of schistosomiasis. Second report.” 50 (1), 81-84.
- d. KERSHAW, W. E., DEEGAN, T., MOORE, P. J. & WILLIAMS, P., 1956.—“Studies on the intake of microfilariae by their insect vectors, their survival, and their effect on the survival of their vectors. VIII. The size and pattern of the blood-meals taken in by groups of *Chrysops silacea* and *C. dimidiata* when feeding to repletion in natural conditions on a rubber estate in the Niger delta.” 50 (1), 95-99.
- e. MANEELY, R. B., 1956.—“A note on the value of Nönex as an embedding medium in invertebrate histology.” 50 (1), 101-104.

(7a) The microfilaria of *Acanthocheilonema perstans* can develop to the infective stage in *Culicoides inornatipennis*. That it can also do so in *C. grahami* is confirmed but in this species it seldom develops to the infective stage. The natural infection rate with filarial parasites in wild flies was 0.5% or less. R.T.L.

(7b) Hill has made preliminary tests of a series of di-(*p*-aminophenoxy) alkanes against *Schistosoma mansoni* in albino mice. He describes techniques for routine testing and for more precise assay of potency and toxicity from which therapeutic ratios can be obtained. The number of mice cured was considered to be a better criterion of activity than the number of worms killed. The methane, ethane and decane members were inactive but the others showed marked activity and the results for the heptane, octane and nonane members warranted more detailed investigation: the hexane member was the most toxic. M and B 968A, 1:5-di-(*p*-aminophenoxy) pentane dihydrochloride, was studied in greatest detail and was shown, in mice, to have a much more rapid action than had miracil-D; it was subsequently tested on two infected rhesus monkeys but showed only a low activity and had a temporary deleterious effect on their sight. S.W.

(7c) This second report on an experiment to control schistosomiasis haematobia on Likema Island, Lake Nyasa, shows that health education has so far had little effect and that sanitary discipline is still poor. Clearing the vegetation and debris followed by molluscicides proved only temporarily successful. Molluscan breeding in the rainy season is so prolific that the lake shore infestation is likely to return to its former level in a year or so. Combined snail

destruction and mass treatment of infected and suspected persons with nilodin between April 1951 and December 1954 reduced the diagnosed infection rate from 27.6% to 7.83%.
R.T.L.

(7e) Maneely commends Nonex 63B, a stearate of polyethylene glycol 1000 (PEG), as an embedding medium which obviates much of the shrinkage and distortion associated with paraffin wax and celloidin especially where hard and soft components are in juxtaposition.
R.T.L.

8—Australian Veterinary Journal.

a. PEISLEY, H. R., 1956.—“A survey of the incidence of echinococcosis in sheep.” 32 (3), 61–62.

(8a) A survey of the incidence of hydatid cysts in sheep slaughtered at the Canberra abattoirs gave a much higher incidence than would have resulted from the normal routine meat inspection, as a detailed examination was made of the lungs as well as the liver. Many with cyst-free livers had cysts, only 1/4 in. or less in diameter, in the lungs. Blood samples from sheep were tested by the complement fixation test: 37 out of 41 gave positive titres (14 strong and 23 weak). 30% of 4,041 sheep from 20 widely separated properties in New South Wales and the Australian Capital Territory were affected with hydatid while the incidence on any one property varied from 7% to 78%.
R.T.L.

9—Berliner und Münchener Tierärztliche Wochenschrift.

a. HÖRNING, B. & ROSENFELD, V., 1956.—“Zwei weniger bekannte Saugwürmer (Trematoda: Dicrocoeliidae) aus der Gallenblase der Amsel (*Turdus merula*). 1. *Brachylecithum attenuatum* (Dujardin, 1845). 2. *Oswaldoia turdia* Ku, 1938.” 69 (6), 116–117.

(9a) Brief descriptions, with illustrations of the adults and eggs, are given of *Brachylecithum attenuatum* and *Oswaldoia turdia* which have been found in the gall-bladder of *Turdus merula* in Germany for the first time.
R.T.L.

10—British Medical Journal.

- a. JORDAN, P., HOPE TRANT, M. & LAURIE, W., 1956.—“Non-bancroftian elephantiasis in Tanganyika.” Year 1956, 1 (4960), 209–210.
- b. MCGREGOR, I. A. & GILLES, H. M., 1956.—“Diethylcarbamazine control of bancroftian filariasis. Follow-up of a field trial in West Africa.” Year 1956, 1 (4962), 331–332.
- c. ANON., 1956.—“Onchocerciasis.” [Annotation.] Year 1956, 1 (4962), 339–340.
- d. GUZ, A. & LEA, P. A. W., 1956.—“Unusual case of hydatid disease of the peritoneum.” Year 1956, 1 (4963), 385.

(10a) The clinical manifestations observed in bancroftian and non-bancroftian filariasis in Tanganyika are compared and contrasted. In non-bancroftian filariasis the recurrent pain in the groins does not appear to be centrifugal. The incidence of inguinal adenitis is low and the disease is frequently bilateral. It is suggested that the obstruction responsible for this type of elephantiasis is in the iliac glands. The causative agent remains a matter for conjecture.
R.T.L.

(10b) McGregor & Gilles report on a survey, made in 1954, of the results of treatment of filariasis bancrofti with hetrazan in 1951. Of 122 infected persons who were treated in February 1951, 43 were still infected the following December and 32 in November 1954, giving recovery rates of 64.7% and 73.8% respectively. In an untreated group of 46 persons the recovery rate in 1954 was 4.3%. Reinfection apparently occurred in 21.5% of treated persons and 4.9% in those who were not treated. The authors believe that mature filariae are killed or sterilized by the hetrazan but that the immature stages are not affected greatly; their subsequent maturation and reproduction may account for the relapses after periods of apparent cure.
S.W.

11—Canadian Journal of Zoology.

- a. WOLFGANG, R. W., 1956.—“Helminth parasites of reptiles, birds, and mammals in Egypt. II. *Catenotaenia aegyptica* sp. nov. from myomorph rodents, with additional notes on the genus.” **34** (1), 6–20.
- b. WOLFGANG, R. W., 1956.—“*Dochmoides yukonensis* sp. nov. from the brown bear (*Ursus americanus*) in the Yukon.” **34** (1), 21–27.
- c. MAHON, J., 1956.—“*Dendrouterina pilherodiae* sp. nov. (Dilepididae) from *Pilherodias pileatus* (Bodd.)” **34** (1), 28–34.
- d. MAWSON, P. M., 1956.—“Ascaroid nematodes from Canadian birds.” **34** (1), 35–47.
- e. MAWSON, P. M., 1956.—“*Physaloptera variegata* Reiber, Byrd and Parker, 1940 from three species of reptiles.” **34** (1), 75–76.
- f. RONALD, K., 1956.—“A possible test for nematode viability.” **34** (1), 76–77.
- g. MAWSON, P., 1956.—“*Rhabdochona chabaudi* n.sp. from *Barbus meridionalis*.” **34** (2), 79–81.
- h. WEBSTER, G. A., 1956.—“*Placoconus*: a new genus for *Arthrocephalus lotoris* (Schwartz, 1925) Chandler, 1942.” **34** (2), 99–103.
- i. MAHON, J., 1956.—“On a collection of avian cestodes from Canada.” **34** (2), 104–119.
- j. MAWSON, P. M., 1956.—“Capillarid worms from Canadian birds.” **34** (2), 163–164.
- k. MAWSON, P. M., 1956.—“Trichostrongylid worms from Canadian birds.” **34** (2), 164–165.

(11a) *Catenotaenia aegyptica* n.sp. is described and figured from the rodents *Meriones* sp., *Acomys cahirinus* and *Gerbillus gerbillus* in Egypt. It has four to six proglottides and two to four uterine branches. The poral part of the seminal receptacle is much smaller than the antiporal part. It differs from *C. oranensis* in having a much shorter uterine trunk and from *C. baeri* which has only two proglottides, a still shorter uterine trunk and only one uterine branch. The vitelline gland is large and boomerang-shaped. In an appraisal of the systematics of the genus *Catenotaenia*, Wolfgang supports the retention of *Catenotaeniinae* Spasski, 1940, considers that *Skrjabinotaenia* is a synonym of *Catenotaenia* and transfers *Meggittina baeri* to *Catenotaenia* as *Catenotaenia baeri* (Lynsdale, 1953) n. comb. *C. laguri* and *C. peromysci* are made synonyms of *C. dendritica*. The variety of characters used to separate species of *Catenotaenia* are discussed and criticized and a new generic diagnosis is provided. R.T.L.

(11b) *Dochmoides yukonensis* n.sp. in *Ursus americanus* from the Yukon resembles *D. stenocephala* and *D. hamiltoni* (Baylis, 1933) n. comb. but is larger and has proportionally longer spicules. It lacks the salient excretory pore present in *D. stenocephala* and the eggs are 75–83 μ as compared with 135–138 μ in *D. hamiltoni* which it resembles in other respects save in host and geographical location. R.T.L.

(11c) *Dendrouterina pilherodiae* n.sp. from *Pilherodias pileatus* in Brazil is the first species of the genus to be reported from South America. It is differentiated from *D. botauri* in the size and shape of the large hooks which though approaching in size those of *D. ardeae* differ in shape. Its cirrus pouch is smaller than in *D. herodiae* or *D. botauri* but considerably larger than in *D. ardeae*. The testes number only 15 to 20 per segment. R.T.L.

(11d) Ten known and three new Ascaroidea are recorded from birds in Canada, viz., *Porrocaecum ensicaudatum* from *Turdus m. migratorius*, *Molothrus a. ater*, *Quiscalus quiscula* and *Corvus b. brachyrhynchos*, *Porrocaecum trichuriforme* n.sp. from *Bubo v. virginianus* and *Falco peregrinus anatum*, *Contracaecum magnicollare* from *Diomedea* sp., *C. podicipitis* from *Podilymbus p. podiceps*, *C. anasi* n.sp. from *Anas rubripes*, *C. spiculigerum* from *Phalacrocorax a. auritus*, *C. pelagicum* and *Anisakis diomedae* from *Diomedea* sp., *Ascaridia bonasae* from *Bonasa umbellus* and *Dendragapus obscurus fuliginosus*, *Ascaridia columbae* from *Columba livia*, *Heterakis pedioecetes* n.sp. from *Pedioecetes p. phasianellus* and *Subulura* sp. from *Spatula clypeata*. *Porrocaecum trichuriforme* n.sp. is distinguished from *P. depressum* in the shortness of the ventriculus as compared with the oesophagus, the shorter caecum and the labial pulp which forms two lateral lobes and an internal median lobe. *Contracaecum anasi* n.sp. is very like *C. spiculigerum* but differs in the narrowness of the collar and in the arrangement of the papillae on the male tail. The spicules of *Heterakis pedioecetes* n.sp. are unequal, differentiating it from *H. bonasae* in which they are said to be equal. *Contracaecum* sp. Yamaguti, 1941 is named *C. yamaguti* nom. nov. Specimens from *Mergus merganser americanus* agree closely with Yamaguti's description from the Japanese merganser. R.T.L.

(11e) *Physaloptera variegata* is recorded from specimens of *Coluber c. constrictor*, *Ophisaurus ventriculus* and *Heterodon platyrhinos* from Fort Benning, Ga., U.S.A. The first and second are new hosts. Mawson does not accept *P. variegata* as a synonym of *P. abjecta* which should be regarded as a *species inquirenda*.
R.T.L.

(11f) When the Atlantic cod (*Gadus callarias*) was frozen some of the worms in the flesh were fluorescent under "black-light" illumination and others were not. Only the dead worms were fluorescent. It is suggested that this procedure with slight modification might be used as a test for helminth viability.
R.T.L.

(11g) *Rhabdochona chabaudi* n.sp. from *Barbus meridionalis* taken near Banyuls-sur-Mer, France is close to *R. denudata* but has one more pair of post-anal papillae, the cervical papillae and nerve ring are less anterior and the distance between the excretory pore and nerve ring is less. The egg also is smaller.
R.T.L.

(11h) *Arthrocephalus lotoris* is made type of a new genus *Placoconus* very closely related to, but distinct from, *Dochmoides* and *Arthrocephalus*. Webster notes however that *A. lotoris* has a striking resemblance to *Dochmoides stenocephala* and that the morphological affinities outnumber their differences but *A. lotoris* has lacunae in the dorsal wall and the buccal capsule is made up of articulating parts which is a sufficient reason for eliminating it from *Dochmoides*.
R.T.L.

(11i) Twenty species of cestodes from the collection of the Institute of Parasitology of McGill University from 29 Canadian birds are briefly annotated. For the first time *Tetrabothrius erostris* and *Paruterina candelabraria* are recorded for Canada, and *Haploparaxis* [*Aploparaxis*] *parafilum* and *Hymenolepis multififormis* for North America.
R.T.L.

(11j) Mawson has identified in the collections at the Institute of Parasitology of McGill University the following worms from birds on Montreal Island: *Capillaria falconis-nisi* in *Bubo v. virginianus*; *C. anatinis* in *Anas rubripes* and *Glaucionetta clangula americana*; *C. ovopunctatum* in *Sturnus v. vulgaris* and *Quiscalus quiscula*; unidentified females of *Capillaria* spp. in *Corvus b. brachyrhynchos*, *Querquedula discors*, *Anas platyrhynchos domestica*, *A. rubripes* and *A. clangula hiemalis*.
R.T.L.

(11k) Four trichostrongylids from the Institute of Parasitology of McGill University are identified as *Amidostomum cygni* in *Cygnus columbianus*, *Somateria spectabilis* and *Gavia stellata*; *Amidostomum anseris* in *Cygnus* sp.; *Amidostomum spatulum* in *Chen hyperborea atlantica*; and for the first time for Canada *Trichostrongylus tenuis* in *Chen caerulescens* and *C. hyperborea atlantica*.
R.T.L.

12—Countryman. Cyprus.

a. NEAVE, R. M. S., 1956.—"Hydatid disease." March, p. 12.

(12a) In Cyprus hydatid infection in ruminants is as high as in any other country. Efforts are being made to combat the spread of the disease. In the district of Limassol 675 dogs in nine villages have already received the first of a series of three anthelmintic treatments which will be undertaken at intervals of three months.
R.T.L.

13—Empire Journal of Experimental Agriculture.

a. MICHEL, J. F. & MACKENZIE, R. E., 1956.—"An experimental study of certain aspects of the epidemiology of parasitic bronchitis in adult cattle." 24 (93), 61-74.

(13a) Three experiments were designed to show whether husk in older cattle was the outcome of a steady build up of infection in the animals on pasture and the effect of husbandry practices on the severity of lungworm infections. Cattle of varying age were exposed to infection but in no case was a sustained rise in the faecal larval counts observed. The infections in the experimental cattle were not referable to the larvae which they themselves had passed. Older

cattle rapidly acquired an effective resistance to lungworms and outbreaks of husk appear to be due to sudden exposure to high levels of herbage infestation. Various husbandry methods were compared for their efficiency in transmitting lungworms; the results were not consistent but higher herbage infestations resulted from rotational grazing than from free range. D.M.

14—Experimental Parasitology. New York.

- a. KAGAN, I. G. & LEVINE, D. M., 1956.—“Studies on the serology of schistosomiasis. II. The *in vitro* activity of cercariae of *Schistosoma mansoni* in sera of normal and antigen-injected animals.” 5 (1), 48–58.
- b. REINHARD, E. G., 1956.—“Parasitic castration of Crustacea.” 5 (1), 79–107.
- c. OLIVIER, L. & SCHNEIDERMAN, M., 1956.—“A method for estimating the density of aquatic snail populations.” 5 (2), 109–117.
- d. ROWAN, W. B., 1956.—“The mode of hatching of the egg of *Fasciola hepatica*.” 5 (2), 118–137.
- e. BONSDORFF, B. VON, 1956.—“*Diphyllbothrium latum* as a cause of pernicious anemia.” 5 (2), 207–230.

(14a) Kagan & Levine studied the *in vitro* activity of cercariae of *Schistosoma mansoni* in the sera of the cat, cow, chicken, dog, goat, guinea-pig, hamster, horse, man, monkey, mouse, pig, pigeon, rabbit, rat, sheep, squirrel and steer. Except for man, squirrel and steer all species were injected twice weekly for three weeks with a homogenate of cercariae of *S. mansoni* and the sera tested for CHR activity. All normal stored sera inhibited the swimming activity of cercariae of *S. mansoni* and were negative to the CHR test. After the course of cercarial homogenate the fifteen species became positive for CHR, but the time of appearance of the CHR after immunization varied considerably. Stored normal serum of rat, guinea-pig, chicken, dog, steer, pig, sheep and goat was cercaricidal, and the sera of the other species tested inactivated cercariae. After heating at 56°C. for 30 minutes the cercaricidal and inactivating properties of normal sera were lost. The normal serum of cow and horse agglutinated cercariae and in all but rat serum, agglutination was observed during the course of injection of antigen. After heating for 30 minutes at 56°C. an additional eight species agglutinated cercariae. No correlation could be made between the *in vitro* response of serum of naturally resistant hosts, hosts with a high degree of resistance and susceptible hosts against cercariae of *S. mansoni* and the ability of these hosts to form antibodies after injection with a cercarial antigen. The sera of naturally resistant hosts and hosts with a high degree of resistance for *S. mansoni* were more cercaricidal than the sera of hosts susceptible to infection with *S. mansoni*. D.L.H.R.

(14b) In this review of parasitic castration in crustaceans, Reinhard includes three helminths. *Polymorphus minutus* larvae parasitize *Gammarus pulex*, causing suppression of oogenesis and the loss of the marginal hairs on the lamellae of the brood pouch in the females; spermatogenesis in the males is not affected. Larvae of *Nectonema* produce atrophy of the ovaries of *Leander serratus* but do not effect the secondary sexual characters. *Anapagurus hyndmanni* is castrated by the turbellarian *Fecampia erythrocephala*. S.W.

(14c) A simple and reliable method for estimating snail population density consists in counting the number of snails collected in a marked area by one or more experienced collectors using sieves of perforated metal with handles one metre long in a measured interval of time. The most reliable data are those obtained when all collections for a given place are made by one man. R.T.L.

(14d) The hatching of the egg of *Fasciola hepatica* is largely induced by the action of an enzyme, of the proteolytic type, on the substance bonding the operculum to the shell. This enzyme is released by the miracidium when stimulated by light. It has no effect when applied to the outside of the shell. The viscous cushion which fills the opercular end of the egg cavity and lies within the vitelline membrane expands suddenly. The vitelline membrane ruptures. The viscous cushion flows out of the shell followed by the miracidium which owes its escape to the hypertonicity of the shell contents and only secondarily to its own activity. R.T.L.

(14e) The literature dealing with the role of *Diphyllobothrium latum* in the production of pernicious anaemia is reviewed and critically examined as the descriptions given in text-books are mostly erroneous. The clinical picture is identical with genuine pernicious anaemia except that the gastric juice is frequently normal or abundant, it occurs in younger people and is rapidly curable. Bonsdorff considers how *D. latum* causes pernicious anaemia and why it develops only in some carriers of *D. latum*. Investigations have shown that dried *D. latum* may be used as extrinsic factor in Castle's test, that aqueous extract of the tapeworm injected parenterally produces maximal haematological remission and improvement of the neurological disturbances in pernicious anaemia and that there is an intense vitamin B₁₂ activity in this tapeworm whereas in *Taenia saginata* the average amount of B₁₂ is only 2% of that in *D. latum*. It is concluded that the host and tapeworm compete for vitamin B₁₂ and if the parasite is located in the proximal part of the small intestine a deficiency of this substance can eventually cause the anaemia. A poor supply of extrinsic factor and/or reduced production of intrinsic factor contribute to its development. R.T.L.

15—Farming in South Africa.

- a. NAUDE, T. J., 1956.—“Entomology. Nematodes.” [Report of the Department of Agriculture for the year ended 31st August, 1955.] 31 (359), 91.
- b. ALEXANDER, R. A., 1956.—“Veterinary Services. A.—Research. Helminthology.” [Report of the Department of Agriculture for the year ended 31st August, 1955.] 31 (359), 109–110.

(15a) The following species of plant-parasitic nematodes are stated to occur in South Africa. *Meloidogyne hapla*, *M. javanica*, *M. arenaria* var. *thamesi*, *M. acronea* n.sp. and a series of races of *M. incognita* var. *acrita*. All these species attacked croton oil plants. Velvet beans were susceptible to *M. arenaria* and *M. javanica* and cotton plants to *M. incognita* var. *acrita*. *M. acronea* attacked all grain and grass species as well as potatoes. In green-house tests only *M. hapla* attacked the roots of peanuts and strawberries so that where only *M. javanica* and *M. arenaria* var. *thamesi* are present these plants could be used in a rotation. R.T.L.

(15b) When given by hypodermic injection carbon tetrachloride and tetrachlorethylene, even in amounts very much higher than those normally administered orally, and chlorthion also, proved unsatisfactory as an anthelmintic. Severe outbreaks of amphistome infection occurred in the Orange Free State and Transvaal highveld during 1945. Dosing with tetram produced no improvement. R.T.L.

16—Fukuoka Acta Medica.

- a. NAGAO, M., 1956.—“A study of the human gnathostomiasis experimentally infected with the larvae of *Gnathostoma spinigerum*.” 47 (3), 366–378. [In Japanese: English summary pp. 366–368.]

(16a) In an experimental study of gnathostomiasis in man 3rd-stage larvae of *Gnathostoma spinigerum* killed by heat were inserted into the muscle and into the subcutaneous tissue. In both experiments the percentage of eosinophils in the peripheral blood rose from 4% to 10.5% in nine days and returned to normal by the 21st day. The monocytes rose from 4.5% to 11% in 14 days and fell to 7% by the 21st day. The worm body extracted from the muscular tissue after 25 days had undergone little change and there was no reaction in the surrounding tissue but the worm removed from the subcutaneous tissue had been almost completely absorbed and was embedded in granulomatous tissue infiltrated by mononuclear cells, foreign body giant cells and a large number of phagocytes. Antigen prepared from gnathostome larvae gave a faint skin reaction 25 days after the commencement of the experiment. R.T.L.

17—Indian Journal of Medical Research.

- a. BHASKARAN, T. R., SAMPATHKUMARAN, M. A., SUR, T. C. & RADHAKRISHNAN, I. 1956.—“Studies on the effect of sewage treatment processes on the survival of intestinal parasites.” **44** (1), 163–180.

(17a) In Calcutta and its industrial suburbs the daily average discharge of helminth eggs varied from 22,200 to 219,650 per capita. Sedimentation of sewage for about two hours removed 50% to 70% of the eggs. None of the sewage treatment processes ordinarily used leads to complete removal of helminth eggs from the effluent. The effluent from a well operated experimental septic tank providing three days detention time gave less than two eggs per gallon of sewage. The septic tank-cum-stone bed (contact bed) was proved effective and the effluent could be discharged safely into water courses. Activated sludge treatment had a high efficiency and only a few eggs were recovered occasionally from the effluent. The trickling filter had the same efficiency. The laboratory technique used in these investigations for the quantitative evaluation of helminth eggs in sewage and sludge samples was as follows: a sample of about 600 c.c. of sewage was allowed to sediment overnight in a room temperature under 4°C. Next morning the supernatant fluid was decanted and about 100 c.c. of sediment was taken up in saturated salt in a narrow cylinder and left for one hour. The top layer, about 10 c.c., was carefully pipetted off and the number of eggs per c.c. of the solution were counted in a Whipple counting cell and disc.

R.T.I.

18—Indian Veterinary Journal.

- a. SAMBAMURTHI, B., 1956.—“Cardiac hydatidiasis in the bovine.” **32** (5), 347–350.
 b. BISWAL, G., 1956.—“Incidence of nasal schistosomiasis in buffaloes in Orissa. Preliminary report.” **32** (5), 360–361.
 c. NAWATHE, D. R., 1956.—“Useful vermicides for control of worms in cattle.” **32** (5), 370–371.

(18b) Nasal schistosomiasis has hitherto been considered rare in buffaloes although common in cattle in India. Biswal now reports that in nasal scrapings from 45 buffaloes examined at the District Livestock Breeding Farm, eggs and miracidia, indistinguishable from those seen in cattle, were present in 25.

R.T.I.

(18c) In some villages in the Raipur District of Madhya Pradesh nearly 75% of the cattle suffer from helminth infections. Hexachlorethane in fractional doses of 15 gm. twice daily effected a cure in one to ten days. Animals in very poor condition responded satisfactorily to phenothiazine given twice at a weekly interval. Mortality in calves was reduced considerably by treatment with 5 gm. to 10 gm. doses.

R.T.I.

19—Journal of the American Veterinary Medical Association.

- a. GAAFAR, S. M. & TURK, R. D., 1956.—“A nematode parasite, *Murshidia falcijera* (Cobbold, 1882) from an Indian elephant.” **128** (2), 84.
 b. STUBBS, E. L., 1956.—“Gapeworm (*Cyathostoma bronchialis*) infection in a duck.” **128** (3), 138.
 c. CIORDIA, H. & JONES, A. W., 1956.—“The incidence of intestinal helminths in dogs and cats in Knoxville, Tennessee.” **128** (3), 139.
 d. POUNDEN, W. D., BELL, D. S., EDGINGTON, B. H. & THOMAS, D. L., 1956.—“Disease conditions observed in lambs at slaughter.” **128** (6), 298–301.
 e. BUSH, D. L., 1956.—“Enzootic echinococcosis in Uruguay—some public health and livestock aspects.” **128** (7), 329–331.
 f. DOUGLAS, J. R., BAKER, N. F. & LONGHURST, W. M., 1956.—“Trial with di-phenanthene-70 on stomach and intestinal nematodes in sheep.” **128** (7), 361–362.

(19a) Several *Murshidia falcijera* were found at the post-mortem on an Indian elephant which had been in the U.S.A. for 40 years. It was estimated that the elephant was between 85 and 120 years old.

R.T.I.

(19b) Large numbers of *Cyathostoma bronchialis* were collected at autopsy from the trachea and bronchi of a young white Peking duck in Philadelphia. Although this species

gapeworm has been recorded from geese in the U.S.A. this is the first report of its presence in ducks in North America.

R.T.L.

(19d) Although *Muellerius capillaris* were found in 253 out of 419 lambs of known origin slaughtered in Ohio there did not appear to be any relationship between the worms and the pneumonic lesions observed in these animals. Nodular lesions occurred in the intestines of 52.8% but in only 9% were the intestines unacceptable for better class trade purposes. The possible connection between nodular lesions and liver abscess is discussed.

R.T.L.

(19e) Conditions in the interior of Uruguay are ideal for the dissemination of *Echinococcus granulosus*. Within an average square mile there are about 332 sheep, 111 cattle, 4 to 8 dogs and 33 persons exposed to this infection. In various provinces the livers condemned for hydatid or flukes, or both, range from 25% to 100%. Evaluation of economic losses from hydatid alone is however extremely difficult.

R.T.L.

(19f) Although di-phenthane-70 is reputed to remove *Thysanosoma actinioides* it had no significant effect on stomach and intestinal nematodes in sheep.

R.T.L.

20—Journal of Helminthology.

- a. SPEDDING, C. R. W. & BROWN, T. H., 1956.—“The ‘spring rise’ in the nematode egg-count of sheep.” **29** (4), 171–178.
- b. SPEDDING, C. R. W., 1956.—“The control of worm-infestation in sheep by grazing management.” **29** (4), 179–186.
- c. GOODEY, J. B. & BROWN, E. B., 1956.—“Stem eelworm attacking carrots.” **29** (4), 187–192.
- d. ROBINSON, D. L. H., 1956.—“A routine method for the maintenance of *Schistosoma mansoni* in vitro.” **29** (4), 193–202.
- e. YEH, L. S., 1956.—“On a collection of helminths from Thomson’s gazelle, *Gazella thomsoni*, from Tanganyika.” **29** (4), 203–228.
- f. BUCKLEY, J. J. C. & EDESON, J. F. B., 1956.—“On the adult morphology of *Wuchereria* sp. (malayi?) from a monkey (*Macaca irus*) and from cats in Malaya, and on *Wuchereria pahangi* n.sp. from a dog and a cat.” **30** (1), 1–20.
- g. SOMMERVILLE, R. I., 1956.—“A note on the specific identity of *Trichostrongylus longipicularis* Gordon, 1933.” **30** (1), 21–24.
- h. McFADZEAN, J. A. & SMILES, J., 1956.—“Studies of *Litomosoides carinii* by phase-contrast microscopy: the development of the larvae.” **30** (1), 25–32.
- i. FRANKLAND, H. M. T., 1956.—“The effect of light on the emergence of *Cercaria pygocotyphora*, a furcocercaria from *Planorbis carinatus*.” **30** (1), 33–40.
- j. BISSERU, B., 1956.—“On a new acanthocephalan, *Echinopardalis lerouxi* n.sp., from a jackal (*Canis adustus*) in Central Africa.” **30** (1), 41–50.
- k. BISSERU, B., 1956.—“Three new species of the genus *Neodiplostomum* Railliet, 1919, from Central African birds of prey, with a note on *Neodiplostomum canaliculatum* (Nicoll, 1914) Dubois, 1937.” **30** (1), 51–62.
- l. BISSERU, B., 1956.—“On four new trematodes of the genus *Strigea* from Central African birds of prey.” **30** (1), 63–79.

(20a) Experiments were carried out on four groups of sheep differing in type of management, diet and age of the animals. Worm reinfestation was precluded from January onwards in two groups and during the spring in the other two. In all four groups a spring rise in the worm egg output was observed. It is suggested that as reinfestation could not have occurred the spring rise was due to an increase in the egg output of the existing worm population. It was confirmed that the initial spring rise was coincident with lambing and that the nutritional value of the diet influenced the magnitude of the spring increase.

D.M.

(20b) Experiments were designed to overcome the difficulties in studying the sub-clinical effect of worm burdens on the productivity of sheep. By folding the lambs over a new ley on land that was last grazed by sheep 11 months before the experiment and by preventing the lambs from running back on to the grazed area reinfestation with nematodes, with the exception of *Strongyloides papillosus*, was prevented. Subclinical infestation of the lambs resulted in a significant depression of live-weight gain.

D.M.

(20c) The host range of a population of *Ditylenchus dipsaci* attacking field carrots in 1952 was investigated in pots and in the field. In pots, carrots, celery, *Vicia faba*, garden peas, oats and potatoes were attacked while in the field only carrots, celery, *V. faba* and fools parsley (*Aethusa cynapium*) suffered. Blister-like lesions on the stems of *V. faba* containing eelworm wool suggested a comparison with the giant race of *D. dipsaci*. Tabular data compare the sizes and certain body ratios of eelworms of the two races. It was concluded that the population attacking carrots was neither the giant race nor was it what we should call the normal oat race.

J.B.G.

(20d) Robinson describes in detail the method of maintenance of adult *Schistosoma mansoni* in vitro for long periods in an all glass apparatus previously described by Newsome & Robinson in 1954 [for abstract see Helm. Abs. 23, No. 74f]. Medium consisting of horse serum containing 0.1% added glucose was filtered by a 14 cm. Seitz filter into a 250 ml. reservoir and the worms which lay in a carrel flask type worm chamber were provided with a change of medium by daily withdrawal of 3-5 ml. of medium from the apparatus. By this method worms were maintained for up to two months. Dilution of the medium with Tyrode's solution was considered unsatisfactory and the addition of haemoglobin had no observable beneficial effect. In human serum the results were similar to those obtained in the horse serum medium. Egg-laying occurred in vitro on numerous occasions but no attempt was made to determine whether it continued throughout the life of the worms in vitro. Copulation occurred frequently. Decreases in temperature even for long periods appeared to have no harmful effect but increases in temperature, even if small and of short duration, usually resulted in the death of the worms. Minor fluctuations in pH appeared to have no harmful effects on the worms. The glycogen contents of fresh and cultured worms are given as percentages of fresh weight. After up to 17 days in the serum medium there appeared to be no loss in the glycogen content of the worms and when maintained for short periods in Tyrode's solution the results were similar. It is suggested that the worms do not rely on their reserves of glycogen for life in vitro but can take up carbohydrate from the medium. The method of maintenance although devised for schistosomes could be adapted for other helminths.

D.L.H.R.

(20e) In a collection of helminths from *Gazella thomsoni* from Tanganyika Territory, Yeh reports one species of trematode, *Paramphistomum microbothrium*, one species of larval cestode, *Taenia hydatigena*, and 11 species of nematodes, viz., *Trichuris spiricollis*, *Haemonchus contortus*, *Trichostrongylus probolurus*, *Gazellofilaria tanganyikae*, *Cooperioides antidorca*, *Paracooperia serrata*, *P. daubneyi*, *Longistrongylus meyeri*, *Impalaia nudicollis*, *Gazellostrongylus lerouxi* n.g., n.sp. (Trichostrongylidae) and *Protostrongylus gazellae* n.sp. The seven last mentioned species are all new records for the gazelle. *Gazellostrongylus* is closely related to *Cooperioides* but differs in that the cephalic end tapers abruptly and the mouth has six lips, the oesophagus is short and slightly bulbous in the posterior part, the spicule is distinctly trifurcate and the bursa has very unequal ventral rays. *Protostrongylus gazellae* n.sp. resembles *P. rupicaprae* but differs in the size of the spicule which is much larger and in the different structural arrangement of the capitulum. *Gazellofilaria tanganyikae* Yeh, 1955, which was first demonstrated at a laboratory meeting of the Royal Society of Tropical Medicine and Hygiene [for abstract see Helm. Abs., 24, No. 164r], is redescribed in detail with six figures. The paper ends with a check list of helminths of gazelles.

L.S.Y.

(20f) A further and more detailed and illustrated account is now given of the morphology of the adults of two *Wuchereria* species found in animals in areas of endemic human filariasis in Pahang, Malaya [for abstracts see Helm. Abs., 24, No. 302 l and No. 36a above]. One species found in *Macaca irus* is close to and probably identical with *W. malayi*, the other named *W. pahangi* n.sp. was found in the lymphatic system of domestic dogs and cats. A fragment of a female in *Nycticebus coucang* probably belongs to the same species.

R.T.L.

(20g) It has been suggested that *Trichostrongylus longispicularis* is a synonym of *T. colubriformis*. Sommerville points out however that in *T. colubriformis* the tip of the right spicule

is bluntly rounded and the left ends in a point, whereas in *T. longispicularis* the ends of both spicules are blunt and rounded and it has a semi-transparent membrane projecting from the spicule tip, which *T. colubriformis* lacks. Moreover the gubernaculum is longer and its shape is different in the two species. *T. longispicularis* is normally parasitic in cattle while *T. colubriformis* occurs in sheep. R.T.L.

(20h) A series of photomicrographs taken with a phase-contrast microscope illustrates the development of the ovum and larva of *Litomosoides carinii*. The view that the sheath in which the microfilaria is enclosed in the adult female, in the pleural fluid and in the peripheral circulation is the stretched egg membrane is confirmed. R.T.L.

(20i) The emergence of *Cercaria pygocytophora* from *Planorbis carinatus* is stimulated by the onset of darkness. It continues throughout the dark period but is heaviest between the second and third hour. But some cercariae emerge during the light period especially during the last four hours. The strong negative phototaxis shown by this cercaria suggests that the second intermediate host is nocturnal or is a bottom-inhabiting species. R.T.L.

(20j) *Echinopardalis lerouxi* n.sp. is described from *Canis adustus* in Northern Rhodesia. It differs from *E. atrata* in the smaller size of the hooks and the disposition of the third and fourth hooks and their roots and in having the neck introverted. The six nuclei of the lemnisci are in the middle and hinder portions. There is an appendix posterior to the female genital opening. It also differs from the three South American species in all of which the body is smaller, the proboscis hooks larger and the embryos much smaller. R.T.L.

(20k) *Neodiplostomum* (*Neodiplostomum*) *berghaani* n.sp. from the Bateleur eagle *Terathopius ecaudatus*, *N. (N.) prudhoei* n.sp. from the Cape sea-eagle *Cuncuma vocifer vocifer* and *N. (N.) pseudogypsis* n.sp. from the white-backed vulture *Pseudogyps africanus* are described from material collected by leRoux in Northern Rhodesia and their systematic relationships are discussed. The type specimen of *N. canaliculatum* from the Egyptian eagle-owl *Bubo ascalaphus* which Dubois has treated as a *species inquirendae* is redescribed and figured, and is held to be a valid species. R.T.L.

(20l) *Strigea neotidis* n.sp. from *Neotis cafra denhami*, *S. lilensis* n.sp. and *S. rhodesiensis* n.sp. from *Pseudogyps africanus* and *S. cuncumae* n.sp. from *Cuncuma vocifer vocifer* from collections made by leRoux from birds of prey in Northern Rhodesia are described and their systematic relationships are discussed. R.T.L.

21—Journal of Parasitology.

- a. HUFF, C. G., 1956.—"Parasitism and parasitology." [Presidential address.] 42 (1), 1-10.
- b. RIGGIN, Jr., G. T. & BERRIOS, L. A., 1956.—"The pig as a host of *Schistosoma mansoni* in Puerto Rico." 42 (1), 10.
- c. DAUGHERTY, J. W., 1956.—"The effect of host castration and fasting on the rate of glycogenesis in *Hymenolepis diminuta*." 42 (1), 17-20.
- d. ROBERTS, L. S., 1956.—"Ophiotaenia grandis La Rue (Cestoda: Proteocephalidae) in McCurtain County, Oklahoma." 42 (1), 20.
- e. THORSON, R. E., 1956.—"Proteolytic activity in extracts of the esophagus of adults of *Ancylostoma caninum* and the effect of immune serum on this activity." 42 (1), 21-25.
- f. LEHMANN, D. L., 1956.—"Some helminths of Oregon urodeles." 42 (1), 25.
- g. THORSON, R. E., 1956.—"The effect of extracts of the amphidial glands, excretory glands, and esophagus of adults of *Ancylostoma caninum* on the coagulation of dog's blood." 42 (1), 26-30.
- h. ETGES, F. J., 1956.—"Notes on the use of Technicon mounting medium for in toto preparations." 42 (1), 30.
- i. RISER, N. W., 1956.—"Observations on the plerocercoid larva of *Pelichnibothrium speciosum* Monticelli 1889." 42 (1), 31-33.
- j. BUCHANAN, G. D., 1956.—"Occurrence of the cestode *Mathevotaenia surinamensis* (Cohn, 1902) Spasskii, 1951 in a North American armadillo." 42 (1), 34-38.
- k. WARD, H. L., 1956.—"A new species of *Centrorhynchus* (Acanthocephala) from the kite, *Milvus migrans*, in Egypt." 42 (1), 39-41.

- l. WEHR, E. E. & HERMAN, C. M., 1956.—"*Lophortofilaria californiensis* n.g., n.sp. (Filarioidea, Dipetalonematidae) from California quail, *Lophortyx californicus*, with notes on its microfilaria." 42 (1), 42-44.
- m. SARMIENTO, L. & STOUGH, B. D., 1956.—"*Troglostrongylus wilsoni* (Stough, 1953) n. comb. (Nematoda: Metastrongylidae) from the lungs of the bobcat, *Lynx rufus rufus*." 42 (1), 45-48.
- n. MARKELL, E. K., 1956.—"*Probolitrema mexicana*, n.sp., an anaporrhutine trematode from elasmobranchs of Baja California." 42 (1), 56-59.
- o. CRITES, J. L., 1956.—"A redescription of *Cruzia americana*, a nematode parasitic in the opossum, *Didelphis marsupialis virginiana*." 42 (1), 68-72.
- p. CLARK, D. T., 1956.—"Identification of beta ZnS in the intestinal cells of *Strongylus* spp." 42 (1), 77-80.
- q. OLIVIER, L., 1956.—"The location of the schistosome vectors, *Australorbis glabratus* and *Tropicorbis centimetralis*, on and in the soil on dry natural habitats." 42 (1), 81-85.
- r. ETGES, F. J., 1956.—"Three new cercariae from *Ammicola pilsbryi* Walker, 1906, with some notes on their life histories." 42 (1), 86-93.
- s. SVENSSON, R., 1956.—"Intestinal parasites in Kathmandu, Nepal." 42 (1), 94-95.

(21b) *Schistosoma mansoni* attained maturity and produced viable eggs in two young pigs exposed experimentally to large numbers of cercariae. Severe skin irritation followed exposure. Although no eggs appeared subsequently in the faeces viable and dead eggs were found at autopsy in the liver, intestinal wall and mesentery. The dead eggs were heavily encapsulated. As examination of tissue samples from pigs at the abattoir in a highly endemic area in Puerto Rico proved negative it is concluded that the pig is a poor host. R.T.L.

(21c) A study of the factors which affect the synthesis of glycogen from sodium pyruvate and glucose in *Hymenolepis diminuta* indicated that glucose in this tapeworm is handled in the same manner as in vertebrates. Castration of the rat host caused a decline in the rate of glycogen synthesis from glucose and from pyruvate. When the rat host had fasted for 24 hours before the experiment the glycogen synthesis was at a higher rate from glucose but apparently not from pyruvate. R.T.L.

(21d) *Ophiotaenia grandis* and *O. agkistrodonis* were collected from cottonmouth water moccasin snakes, *Ancistrodon piscivorus*, in McCurtain County, Oklahoma. R.T.L.

(21e) Thorson has demonstrated that extracts from the oesophagus of adult *Ancylostoma caninum* have a pronounced proteolytic action on casein. The pH optimum of approximately 6 indicates that this activity was not of host origin as that of intestinal enzymes is in the alkaline range. The inhibition of the proteolytic activity by serum from a dog refractory to further infection was confirmed. The enzyme-antienzyme relationship in helminth infections is very complex. Good protective immunity may consist of a mosaic of antigen-antibody reactions. R.T.L.

(21f) Lehmann adds the following to his earlier records of helminths in salamanders from the Willamette Valley, Oregon: *Oxyuris dubia* from *Rhyacotriton olympicus* and *Plethodon dumii*. *Hedreris siredonis* from the stomach and encysted monostome cercariae from the mesentery of adult *Ambystoma gracile* and *Megalodiscus americanus* from the rectum of larval *A. gracile*. R.T.L.

(21g) Extracts of oesophagus, excretory glands and amphidial glands dissected from *Ancylostoma caninum* did not delay coagulation when thrombin and fibrinogen were used in blood clotting tests. The amphidial gland extracts increased the prothrombin time of dog plasma and the clot formed was not complete. Normal and immune sera reduced the delay in prothrombin time by amphidial gland extract but the clot was still small as compared with controls in which saline was used. Thorson concludes that his present study does not prove that the bleeding which continues from the site of attachment after the worms are removed is due to an anticoagulant from the amphidial glands. R.T.L.

(21h) Technicon synthetic medium reveals the cuticular spines of trematodes clearly and the hooks and spines of scolices in *in toto* mounts equally well. R.T.L.

(21i) The internal anatomy is described of the plerocercoid larva of *Pelichnibothrium speciosum* recovered from the fish *Alepisaurus ferox* and the cephalopods *Dosidicus gigas* and *Loligo opalescens* off the Californian coast. The scolex is that of a phyllobothriid but the arrangement of organs is remarkably similar to that in some of the aberrant proteocephalids.

R.T.L.

(21j) *Mathevotaenia surinamensis* is redescribed and figured from *Dasytus novemcinctus mexicanus* from Texas and Spasskii's definition of *Mathevotaenia* is emended to read "seminal receptacle not formed by proximal end of vagina or, if formed, not well developed".

R.T.L.

(21k) *Centrorhynchus milvus* n.sp. from the kite *Milvus migrans* in the Faiyum, Egypt differs from other species in number of proboscis hooks of which there are 28 to 32 longitudinal rows with 18 to 21 in each row. The body is cylindrical but distinctly swollen in the anterior fourth. The female measures 24 mm. to 32 mm. and the male 16 mm. to 20 mm.

R.T.L.

(21l) *Lophorotifilaria californiensis* n.g., n.sp. from the heart of the California quail *Lophortyx californica* is separated from the genus *Aproctiana* by the presence of only two pairs of caudal papillae and the subequal length of the spicules. The microfilaria was surrounded by a thin shell and showed no periodicity. The poor condition of the material made it impossible to give details of several morphological characters.

R.T.L.

(21m) *Lynxrus wilsoni* Stough, 1953 is transferred to *Troglostrongylus* as *T. wilsoni* n.comb. *T. wilsoni* is considered to be distinct from *T. troglostrongylus* as the postero-lateral and externo-dorsal rays arise from a common base and are fused proximally for a short distance. This ray pattern necessitates an alteration in Dougherty's key for the separation of *Troglostrongylus* and *Bronchostrongylus* based exclusively on the partial fusion of the antero- and medio-lateral rays in the former and of the medio- and postero-lateral rays in the latter.

R.T.L.

(21n) *Probolitrema mexicana* n.sp. from the abdominal cavity of the elasmobranchs *Urobatus maculatus*, *Dasyatis brevis* and *Mustelus lunulatus* from the Gulf of California differs from other species of the genus in possessing diverticulate or saccate intestinal caeca.

R.T.L.

(21o) Crites, after redescribing *Cruzia americana* from opossums in Ohio, is convinced that all *Cruzia* from the North American opossums are morphologically similar. As the North American specimens (now lost) were identified and incompletely described by Canavan as *C. tentaculata* (Rudolphi, 1819) and were wrongly made types of *C. americana* by Mapleston in 1930, Crites has filed specimens collected from *Didelphis marsupialis virginiana* in Ohio as neotypes of *C. americana*.

R.T.L.

(21p) The inclusions in the intestinal cells of *Strongylus* spp. were first identified by Rogers as of zinc and probably of ZnS. Clark has now confirmed by the X-ray powder diffraction technique that these inclusions are beta ZnS (sphalerite).

R.T.L.

(21q) Olivier has studied the survival of *Australorbis glabratus* and *Tropicorbis centimetralis* in their natural habitats in north-eastern Brazil. These vectors of *Schistosoma mansoni* tend to remain at the ground surface when their habitats dry and do not enter the soil to avoid the consequences. Some enter the top centimetre of soil in the course of normal movement before the water disappears but such penetration is atypical and is unlikely unless the mud is very soft. Moreover, snails embedded in the soil may not be able to emerge unaided. A further careful study of a variety of habitats is, however, desirable.

R.T.L.

(21r) Three new cercariae are described from *Ammicola pilsbryi* collected in Putnam County, N.Y. *Cercaria ammicolensis* n.sp. develops in the redia which lacks locomotor appendages; in other respects it is very similar to the cercaria of *Ribeiroia ondatrae*. *Cercaria parapleurolophocercoides* n.sp. is characterized by its lateral caudal fin folds, two circlets of spines around the anterior end and cephalic glands opening in a 6-4-4-6 pattern. *Cercaria wesenberg-lundi* n.sp. has a median eye spot and resembles *Notocotylus t. triserialis* but has a poorly

developed digestive system and is markedly smaller. The redia is also smaller and has a voluminous gut extending for one-half to three-quarters of the body length. R.T.L.

(21s) Eggs of *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm were found in single stool examinations of a small number of persons, mostly children, during a brief stay in the city of Kathmandu, Nepal. R.T.L.

22—Journal of the South African Veterinary Medical Association.

- a. THORBURN, J. A., 1956.—“Some practical notes on the control of worms in domestic animals.” 27 (1), 15–28.

(22a) These notes give useful information on recent anthelmintics for the treatment and control of helminth infections in farm animals and on the precautions to be taken in their use. R.T.L.

23—Lancet.

- a. LLOYD, E. L., 1956.—“Expelling tapeworms with mepacrine.” [Correspondence.] Year 1956, 1 (6907), 106.
- b. HALAWANI, A., SHAKER, M. H., ABDALLA, A. & SAIF, M., 1956.—“Sulphaemoglobinuria during administration of stibophen.” Year 1956, 1 (6909), 190.

(23b) Attention is drawn to the occasional occurrence of sudden collapse with haemoglobinuria during the treatment of schistosomiasis cases with stibophen. Stibophen is apt to undergo molecular dissociation and become toxic when stored for a long time. R.T.L.

24—Meditsinskaya Parazitologiya i Parazitarnie Bolezni. Moscow.

- a. MISHCHENKO, O. S., 1956.—[On the use of oxygen in the treatment of some cestode infections in children. (Preliminary note).] 25 (1), 54–56. [In Russian.]
- b. SEMENOVA, N. E. & BARABASHKINA, T. I., 1956.—[A case of *Thominx* infection.] 25 (1), 56–58. [In Russian.]
- c. KROTOV, A. I., 1956.—[Data on the physiology of the motor responses of *Ascaris*.] 25 (1), 58–60. [In Russian.]
- d. KROTOV, A. I., 1956.—[The reactions of *Ascaris* to a series of pharmaceutical compounds.] 25 (1), 60–62. [In Russian.]

(24a) Oxygen, in doses of 120–150 ml. per year of age, was intubated into the gastrointestinal tract of 44 children with *Hymenolepis nana* infections (15 also harboured other helminths) after a preparatory dosing with 20–40 ml. of a 33% magnesium sulphate solution and an enema, and was followed in two hours by a second dose of the purgative. In some cases the treatment was repeated on the second and third day. 23 of the children passed from 3 to 500 *H. nana* on the first and second day after the treatment. In single cases six intubations of oxygen were applied. Ten out of 11 children passed worms only after an additional dose of male fern extract; large numbers of *H. nana* were passed by four children 30–40 minutes after a combined treatment with 50 ml. of 33% magnesium sulphate, 0.5 gm. of the extract and 1,500 ml. of oxygen. Three cases of *Taenia saginata* were also successfully treated. A modified apparatus for the intranasal intubation of oxygen is illustrated. G.I.P.

(24b) *Thominx aerophilus* infection is reported from a woman near Moscow. This is the fifth case recorded for man. The infection was successfully treated by 4 ml. of a solution of 1 ml. each of iodine and potassium iodide in 1,000 ml. of distilled water, given intratracheally, followed by another 6 ml. after seven days. The patient continued to suffer from asthmatic attacks for one year. G.I.P.

(24c) Krotov has studied the influence of changes in the medium, pH, temperature, internal and external pressure and of stimulation by an electric current (using the ascaridograph Krotov, 1953) on the motor responses of whole mature females of *Ascaris suum* and on longitudinal skin and muscle preparations, and has worked out five methods for studying the

responses. Among the changes in the motor responses of *Ascaris* caused by the various factors, he distinguishes eight basic types which fall into two groups: (i) changes which characteristically retain responses to electric current stimulation and where the reaction is preferentially on the nervous system and (ii) changes which paralyse responses to current stimulation and where the reaction is preferentially on the musculature. G.I.P.

(24d) Krotov tested the action of about 22 widely different chemical substances on the muscular activity of whole mature females of *Ascaris suum* and of fragments of the worms using a kymograph and gives the results obtained with these compounds. G.I.P.

25—Nature. London.

- a. WRIGHT, C. A., 1956.—“*Bulinus* (*Pyrgophysa*) *forkalii* (Ehrenberg) as a vector of *Schistosoma haematobium*.” [Correspondence.] 177 (4497), 43.
- b. STANILAND, L. N., 1956.—“Solubilized chemicals for the control of plant nematodes.” [Correspondence.] 177 (4498), 97.
- c. LEGOWSKI, T. J. & BROWN, E. B., 1956.—“Reproduction of potato root eelworm during the winter in a potato clamp.” [Correspondence.] 177 (4502), 287.
- d. WALLACE, H. R., 1956.—“Migration of nematodes.” [Correspondence.] 177 (4502), 287–288.
- e. FAIN, A., 1956.—“Nasal trichobilharziasis: a new avian schistosomiasis.” [Correspondence.] 177 (4504), 389.
- f. POYNTER, D., 1956.—“Effect of a coliform organism (*Escherichia*) on the second ecdysis of nematode larvae parasitic in the horse.” [Correspondence.] 177 (4506), 481–482.
- g. PEACOCK, F. C., 1956.—“The reniform nematode in the Gold Coast.” [Correspondence.] 177 (4506), 489.

(25a) Wright is of opinion that the vector of *Schistosoma haematobium* in the Gambia is not *Bulinus forskali* which also occurs in that area but another *Bulinus* species which can be differentiated from it morphologically and oecologically and is tentatively identified as *B. ludovicianus* (Mittre). The specimens of *Bulinus* from Mauritius deposited by Adams in the British Museum (Natural History) and identified by Connolly as *B. forskali* are undoubtedly *B. cernicus* (Morelet). Connolly was responsible for including *B. cernicus* erroneously in the synonymy of *B. forskali*. R.T.L.

(25b) In glass-house soils a high order of control of *Heterodera rostochiensis* in potatoes has been obtained by watering the infected soil with various solubilized chemicals at the rate of one gallon per square yard. The effect is best in the upper and drier levels where fumigants are least effective. The combination of an injection of D-D mixture at 400 lb. per acre quickly followed by two gallons per square yard of solubilized chemical to wet the top two to three inches of soil has given excellent results in commercial glass-houses. The most suitable detergent for solubilization was a commercial brand of the long-chain alkyl sulphate type. R.T.L.

(25c) Cysts of *Heterodera rostochiensis*, some white and others yellow containing embryonated eggs, were found on the roots of potato tubers in a freshly opened clamp early in March, 1955 in the Isle of Ely. The infestation in the field from which the potatoes had been clamped was at the rate of 5.24 viable cysts per gm. and 1,072 eggs per gm. of air-dried soil. R.T.L.

(25d) Wallace describes and figures an apparatus used for the study of the relation between the pressure-deficiency and the migration of *Ditylenchus dipsaci* in sand particles 200 μ to 400 μ and water. With an increase in the pressure-deficiency from 5 cm. to 40 cm. of water the migration of the eelworm rose correspondingly; when the increase was greater than 40 cm. of water migration declined. At the pressure-deficiency for maximum mobility of 40 cm. of water in the sand particles about 25% of the pore space is occupied by air. Experiments in progress suggest a similar relationship between the distribution of water in sand and the migration of *Heterodera schachtii*. R.T.L.

(25e) Nasal schistosomiasis due to *Trichobilharzia* spp. is very common in certain birds in the Belgian Congo and the Ruanda-Urundi. The adults are present exclusively in the small veins of the nasal cavities and the eggs in the nasal mucus. The five new species found are being described elsewhere. R.T.L.

(25f) When infective larvae of horse strongylids were put in Seitz filtered natural duodenal contents not more than 9% underwent ecdysis within 24 hours, whereas when unfiltered duodenal contents were used the ecdysis rose to 90% to 100%. Poynter finds that at least four coliform organisms (*Escherichia*) are capable of inducing this acceleration of ecdysis.

R.T.L.

(25g) Peacock names eighteen host plants for *Rotylenchulus reniformis* from near Accra. Eight of them are new plant hosts for this nematode and the remainder are new records for the Gold Coast.

R.T.L.

26—Nematologica.

- a. GOFFART, H., 1956.—“Nematodenforschung und Pflanzenquarantäne.” 1 (1), 5-12. [Discussion pp. 12-13.]
- b. D'HERDE, J., KIPS, R. H. & BRANDE, J. VAN DEN, 1956.—“Aperçu des techniques employées dans les recherches sur le nématode doré de la pomme de terre.” 1 (1), 14-19. [Discussion p. 19.]
- c. SCHUURMANS STEKHOVEN, J. H., 1956.—“New names proposed for three homonyms.” 1 (1), 19.
- d. BIJLOO, J. D. & BOOGAERS, P. A. M., 1956.—“Population decrease of *Heterodera rostochiensis* after DD treatment of the soil.” 1 (1), 20-29. [Discussion pp. 29-30.]
- e. GRAINGER, J., 1956.—“Progress in soil mixing for nematode control.” 1 (1), 31-46. [Discussion p. 46.]
- f. MINDERMAN, G., 1956.—“Aims and methods in population researches on soil-inhabiting nematodes.” 1 (1), 47-49. [Discussion p. 50.]
- g. DONCASTER, C. C., 1956.—“Electronic flash in photomicrography.” 1 (1), 51-55.
- h. HESLING, J. J., 1956.—“Some observations on *Heterodera major*.” 1 (1), 56-62. [Discussion pp. 62-63.]
- i. SOUTHEY, J. F., 1956.—“National survey work for cereal root eelworm (*Heterodera major* (O. Schmidt) Franklin).” 1 (1), 64-69. [Discussion pp. 70-71.]
- j. NOLTE, H. W., 1956.—“Beiträge zum Problem der Aktivierung der *Heterodera*-Zysten.” 1 (1), 72-77. [Discussion pp. 77-78.]

(26a) Goffart discusses the bearing of nematode research on plant quarantine requirements. He concludes that in our present state of knowledge we cannot yet ignore the demand that plants for export shall be certified to have been grown in soil free from nematode cysts. This is based on observations relating to the efficacy of control measures. Horse-radish can be successfully treated with hot water to kill adhering cysts. Lily-of-the-valley crowns treated with nematocidal concentrations of mercurial solutions are set back in growth and in readiness of flowering. Aabulba is stronger nematocidally than Aaventa but is also more phytotoxic. Potato tubers are very sensitive to mercurial treatment which causes severe delay to sprouting. Plants vary in their sensitivity to mercurial treatment, not only between species but depending also on their condition at the time of treatment and in the handling they receive after treatment.

J.B.G.

(26b) The authors describe their techniques for investigations on *Heterodera rostochiensis*. Methods are described for extracting cysts from soil samples, testing soil fumigants, testing *Solanum* spp. for resistance and for the production of cysts and of potato root diffusate in bulk.

M.T.F.

(26c) The author proposes the following names in place of certain homonyms. *Phanoderma falcicauda* for *P. elegans* Schuurmans Stekhoven, 1950, *Symplocostoma obtusidens* for *S. longiseta* Schuurmans Stekhoven, 1950 and *Bradybucca* for *Anoncholaimus* Schuurmans Stekhoven, 1950.

J.B.G.

(26d) In a field infested with *Heterodera rostochiensis* three small plots were treated with 40 ml. and three with 80 ml. of D-D mixture per square metre. Three plots were left untreated. Soil samples were taken immediately before treatment, and one, four, seven, ten and thirteen months after treatment. Cysts removed from the samples were tested for hatching

with potato root diffusate for two-and-a-half months and the remaining cyst contents examined; the cysts from an equal amount of soil were broken up by a homogenizer technique one day after sampling and the contents classified and counted. Cysts from untreated plots showed a reduction of 70% in numbers of living eggs between April and August, 64% being due to hatching of larvae and 6% to death of the eggs. In hatching experiments 86% of the living larvae hatched. From August until February the cysts were dormant. A large number of the eggs in cysts from the D-D treated plots were found to be dead one month after treatment, but no further effects were observed. The cysts contained some eggs capable of hatching. It was found that in cysts from treated plots larvae were killed within the eggs and decomposed giving increased counts of "empty" eggs seven months after treatment. It is concluded that D-D does not cause larvae to hatch from cysts in the absence of a potato crop. M.T.F.

(26e) The majority of *Heterodera rostochiensis* cysts are found in the top eight inches of soil. In pot experiments mercury compounds with a mercury equivalent as low as 5.4 lb. mercury per acre have given over 80% control of infestation increase of eelworm. Mercury compounds appear to be reduced to metallic mercury in soil: the addition of finely divided metallic mercury in an inert carrier has been effective in controlling eelworms. The quality of the mixing of the compound and the soil determines the efficacy of the control. By using radio-active iodine (I^{131}) as a tracer, Grainger was able to determine in the field the quality of soil mixing by a variety of machines. Satisfactory distribution was obtained when the variation shown by the added material was no more than $\pm 20\%$ of the desired mean. Although existing machines were not entirely satisfactory, promising results were obtained from a combination of roto-spade and rotary cultivator when the added substance was placed on the surface and at four-and-a-half inches deep in the soil. The mixing was only efficient to six inches instead of the desired eight inches. The mechanical treatments appeared to be only about 40% of the desired performance at this limited depth. J.B.G.

(26f) In a brief outline Minderman states that the aim of the research carried out at the Institute for Biological Field Research, Arnhem, is to gain an insight into what happens amongst the nematodes and associated organisms in a natural soil community. New techniques are mentioned but not described in detail. M.T.F.

(26g) Doncaster describes in detail the equipment and methods he uses in taking electronic flash photographs of living nematodes at exposures less than 0.2 of a millisecond. The photographs may be used for making accurate measurements and for checking possible artefacts in fixed specimens. M.T.F.

(26h) Larvae in cysts of *Heterodera major* failed to hatch after the cysts had been exposed to drying in an incubator for eight hours; four hours' exposure caused a marked reduction in hatching. Methods of extracting cysts of this species from soil have to be modified to make allowance for this and for the fact that newly formed cysts do not float readily. Hesling gives a method by which the cysts may be obtained in a viable state with the aid of a Fenwick can followed by an elutriation technique. The cysts must be stored damp at a temperature of 2°C., at which temperature the rate of hatching is very low. In pot experiments with infested soil kept fallow, the larval content of cysts was reduced by 75% between March and July. M.T.F.

(26i) Two methods were used in sampling 262 fields for cereal root eelworm, *Heterodera major*; soil samples were taken before cropping, or plant samples were taken from June onwards and the roots examined for cysts either dry or after washing. The results show that cereal root eelworm is present in all but five counties in England and Wales and 43% of the fields were infested. The nematode was more common and crop damage was more evident in light than in heavy soils. The degree of damage was rather greater in fields where the level of infestation was higher but the data are insufficient for a close comparison. There was no evidence of any differences in infestation between spring and winter sown oats. Plant sampling

appeared to be slightly more efficient than soil sampling in detecting infestations but the washing of roots was not justified by the slight increase in accuracy obtained. In the discussion B. A. Cooper expresses the belief that cereal root eelworm has been a pest of agricultural crops for hundreds of years and suggests that it may have been the cause of bad harvests and consequent changes in husbandry when periods of arable cultivation alternated with periods of neglect or grassland. M.T.F.

(26j) Anhydrotetrone acid was found to stimulate hatching of larvae from cysts of *Heterodera rostochiensis* at concentrations of 0.02% to 0.2% and at a pH range of 2.5 to 3.2. This chemical was used in experiments to test the effect of antibiotics on hatching. Batches of cysts were soaked for one to two hours in 124 filtrates of 50 different strains of *Penicillium* spp. and actinomycetes which were inhibitors of bacteria or fungi. The cysts were then placed in 0.1% anhydrotetrone acid. Hatching was not hindered in any case but there was a suggestion of stimulation in some cases. It would be premature to pass an opinion on the importance of antibiotics in this connection. M.T.F.

27—New Zealand Journal of Agriculture.

- a. HOWSE, A. C., 1956.—“Diseases of turkeys.” 92 (1), 15–16.

28—New Zealand Journal of Science and Technology. A. Agricultural Research Section.

- a. ANDREWS, E. D. & WHITTEN, L. K., 1956.—“The effect of phenothiazine on thyroid glands of sheep.” 37 (5), 414–418.

29—Phytopathology.

- †a. ALLISON, J. L., 1956.—“Stem nematode of perennial forage legumes.” 46 (1), 6.
 †b. ALLISON, J. L., 1956.—“Root knot of perennial forage legumes.” 46 (1), 6.
 †c. ALLISON, P. & BARNES, G. L., 1956.—“Plant disease control by a new class of chemicals, 2-pyridinethiol-1-oxide and derivatives.” 46 (1), 6.
 †d. FEDER, W. A. & FELDMESSER, J., 1956.—“Root abnormalities caused by burrowing nematode infections.” 46 (1), 11.

(29a) Tests for susceptibility to *Ditylenchus* spp. at the seedling stage of varieties of red and white clover and lucerne from widely separated areas in North Carolina showed that all the lucernes were more susceptible than the clovers. The resistant lucerne variety Lahanton had only moderate resistance to the North Carolina collections. So far, of the legumes grown in North Carolina, only lucerne has been found to be damaged by stem eelworm. R.T.L.

(29b) In North Carolina the perennial forage legumes lucerne, red clover, white clover (including Ladino), big and bird's-foot trefoil and sericea lespedeza are attacked by *Meloidogyne* spp. In tests on seedlings and mature plants with *M. arenaria*, *M. hapla*, *M. incognita*, *M. incognita* var. *acrita* and *M. javanica* the clovers and trefoils were susceptible to all these species. The lucernes were very susceptible and sericea lespedezas were moderately resistant to all except *M. hapla*. Some plants of a few lucerne varieties were resistant to all *Meloidogyne* species. To sericea lespedeza the reaction was more variable than to other legume genera. R.T.L.

(29c) It is indicated that the chemical 2-pyridinethiol-1-oxide promises to become the prototype of a new class of foliage and soil fungicides and of nematicides [but no data on the nematocidal effect are given]. R.T.L.

(29d) The lesions caused by *Radopholus similis* in the roots of experimentally infected grapefruit seedlings resembled those in other plants due to various species of *Heterodera*, *Meloidogyne* and *Xiphinema*. R.T.L.

†Abstract of paper presented at the 47th Annual Meeting of the American Phytopathological Society, Atlanta, Ga., December 27–30, 1955.

29—Phytopathology (cont.)

- †e. FELDMESSER, J., FEDER, W. A. & PINCKARD, J. A., 1956.—“The occurrence of *Pratylenchus* spp. in Florida soils.” **46** (1), 11.
- †f. FERRIS, J. M., 1956.—“The effect of soil temperature on the life cycle of the golden nematode.” **46** (1), 11–12.
- †g. FERRIS, V. R., 1956.—“Electron microscopy of golden nematode cyst wall.” **46** (1), 12.
- †h. FOSTER, A. A., CAIRNS, E. F. & HOPPER, B., 1956.—“Modifications in soils of southern pine nurseries produced by fungicidal and nematocidal chemicals.” **46** (1), 12.
- †i. GOLDEN, A. M., 1956.—“Endoparasitism of a spiral nematode on African violet.” **46** (1), 12–13.
- †j. GOOD, J. M., CHRISTIE, J. R. & NUTTER, J. C., 1956.—“Identification and distribution of plant parasitic nematodes in Florida and Georgia.” **46** (1), 13.
- †k. GRAHAM, T. W., 1956.—“Diffusion of soil fumigants in tobacco row treatments.” **46** (1), 13.

(29e) *Pratylenchus* spp. are native to and wide-spread in the State of Florida. *P. pratensis*, *P. brachyurus*, *P. minyus*, *P. zeae* and *P. scribneri* were recovered from samples of soil and roots in central and south Florida. The host plants included citrus, avocado, banana, castor bean, tobacco, tomato, weeds, three grasses and 22 commercial ornamentals. Information from Georgia, North Carolina and Kentucky suggests that *Pratylenchus* is an important genus in the South. R.T.L.

(29f) Seedlings of *Solanum tuberosum*, *S. dulcamara* and *S. citrullifolium* were grown in glazed crocks filled with soil infested with *Heterodera rostochiensis* and kept in tanks at 65°F., 75°F. and 85°F. Examination of roots showed that second-stage infective larvae entered all three host plants but did not develop further in those kept at 85°F. In *S. tuberosum* and *S. dulcamara* the most rapid development occurred at 65°F. There was no development in any of the crocks containing *S. citrullifolium* (which is not a host). R.T.L.

(29g) Electron micrographs of sections of the wall of mature cysts of *Heterodera rostochiensis* reveal two layers separated by a well defined line of demarcation. There are five distinct layers in the inner layer but no sharp divisions or fibrils within the outer layer. A layer, which is probably the basal lamella, is also present. R.T.L.

(29h) Although fumigation of nursery soil with nematicides (methyl bromide, ethylene dibromide and D-D mixture) reduced the severity of black root symptoms in pine seedlings a combination of a nematicide and a fungicide was more effective. R.T.L.

(29i) *Rotylenchus brachyurus* is an endoparasite as well as an ectoparasite of naturally and experimentally infected African violets. In the crown, mature worms often deposit eggs within individual cells. Larvae may fill the cell before migrating to adjoining cells. In the roots the cells were damaged and destroyed and eggs were deposited in nests in the cortical tissue. R.T.L.

(29j) Examination of 133 turf samples from areas in peninsular Florida showed that *Hoplolaimus coronatus* was the most important parasite of St. Augustine grass producing extensive destruction of the root tissues as an internal parasite, although in other grasses it fed primarily from outside. Other species found frequently were *Rotylenchus* spp., *R. erythrinae* and *R. coheni*, *Trichodorus* spp. and *Criconemoides* spp. In Georgia the major pests of Bermuda and Zoysia grasses were *Trichodorus* sp. and *Belonolaimus gracilis* but *Criconemoides* spp. were found in large numbers. R.T.L.

(29k) Counts of free-living nematodes from tobacco rows injected one week previously at 4, 8 and 12 inches horizontally with D-D mixture or ethylene dibromide indicated that the fumigants were well distributed. There was an effective zone 8 to 12 inches horizontally on each side of the injection and in an 8-inch arc above. Root-knot development on tobacco roots five months later gave an average disease index of 14 in the treated rows and of 66 in those untreated. R.T.L.

29—Phytopathology (cont.)

- †l. HARE, W. W., 1956.—“A major gene for resistance to root-knot nematodes in pepper.” **46** (1), 14.
- †m. HARRISON, M. B. & MAI, W. F., 1956.—“Fumigation of encysted golden nematode larvae under controlled environmental conditions.” **46** (1), 14.
- †n. HIRSCHMANN, H., 1956.—“A morphological comparison of two cyst nematodes, *Heterodera glycines* and *H. trifolii*.” **46** (1), 15.
- †o. HOLDEMAN, Q. L., 1956.—“Effectiveness of ethylene dibromide, D-D, and Nemagon in controlling the sting nematode on sandy soils in South Carolina.” **46** (1), 15.
- †p. HOLLIS, J. P. & FIELDING, M. J., 1956.—“Relatedness of ovary length and rate of reproduction in plant nematodes.” **46** (1), 15.
- †q. KRUSBERG, L. R., 1956.—“Studies on the tessellate stylet nematode.” **46** (1), 18.
- †r. LEAR, B., 1956.—“Split-dosage applications of soil fumigants to control stem and bulb nematode on garlic in California.” **46** (1), 18.

(29l) All bell peppers tested were susceptible to *Meloidogyne incognita* var. *acrita*. Four small-fruited hot peppers were highly resistant. F₁, F₂ and F₃ and backcross generations of two resistant peppers crossed with bell peppers supported the hypothesis that resistance of peppers to *Meloidogyne incognita* is controlled by a single gene. The same gene also controlled resistance to *M. incognita* var. *acrita* and possibly to *M. javanica* and *M. arenaria*. R.T.L.

(29m) There was no significant difference in the percentage of surviving encysted larvae of *Heterodera rostochiensis* when exposed at 10°C., 20°C. or 30°C. in glass chambers with controlled humidity to fumigation with D-D mixture, chloropicrin, ethylene dibromide or Vapam. The degree of control was directly proportional to the relative humidity. Control was 90% greater at the highest than at the lowest relative humidity. If encysted larvae were maintained at a high relative humidity for two weeks before fumigation its efficacy was increased. R.T.L.

(29n) The cysts of *Heterodera trifolii* show less pronounced punctation of the surface than those of *H. glycines*. The second-stage larvae differ greatly in body and stylet length, in the distance of the orifice of the dorsal gland from the stylet knobs, in the length and shape of the tail and in the shape of the stylet knobs. R.T.L.

(29o) Fumigation trials for the control of *Belonolaimus gracilis* in a deep sandy soil in South Carolina demonstrated that ethylene dibromide was more effective than D-D mixture when applied between rows of sweet potatoes. Nemagon gave excellent control but the crop yield was lower than in control plots. Plots treated with D-D became reinfested within two months whereas the effect of ethylene dibromide and Nemagon lasted four months. R.T.L.

(29p) The ratio of ovary length to that of the female body length (O/B) was determined for 240 species of plant nematodes and was correlated with the reproduction rates (RR) of the species. Sedentary tylenchs of the *Meloidogyne*, *Heterodera*, *Nacobbus*, *Tylenchulus* and *Rotylenchulus* genera exhibit rapid RR and have O/B values greater than 100%. Migratory tylenchs, aphelenchs and rhabditids have moderate RR and have respectively O/B values of 35.1%, 28.1% and 32.2%. O/B value in *Dorylaimus* is 18.4%, in *Xiphinema* less than 16.8% and in *Mononchus* less than 15.5%. These three genera have low reproduction rates. R.T.L.

(29q) From the number of *Tylenchorhynchus claytoni* recovered from pots of soil previously treated with methyl bromide and planted with various crop plants, tobacco, maize, wheat, sudan grass and Irish potato proved favourable, and *Crotalaria spectabilis*, peanut, pepper, cucumber and mustard unfavourable to a build up of the nematode soil population. In the absence of plants *T. claytoni* lived for several months in moist soil. R.T.L.

(29r) Nematode counts from soil samples and the yields of garlic bulbs indicated that when each half of the total amount is applied to land infested with *Ditylenchus dipsaci* at an interval of ten days Nemagon and D-D mixture were very effective in controlling the infection in California. R.T.L.

29—Phytopathology (cont.)

- †s. LEAR, B. & RASKI, D. J., 1956.—“Survival of root-knot nematodes in grape and tomato roots recovered from soils fumigated with Nemagon.” **46** (1), 18.
- †t. MACDONALD, K. H., 1956.—“A comparison of cysts of *Heterodera rostochiensis* from roots of resistant and susceptible plants.” **46** (1), 19.
- †u. MAI, W. F. & PARKER, K. G., 1956.—“Evidence that the nematode *Pratylenchus penetrans* causes losses in New York State cherry orchards.” **46** (1), 19.
- †v. MARTIN, W. J., 1956.—“Propagation and pathogenicity of *Trichodorus* sp. on cotton and other crops in Louisiana.” **46** (1), 20.
- †w. PERRY, V. G., 1956.—“Nematodes affecting corn in Florida, Alabama, Maryland, and Wisconsin.” **46** (1), 23.
- †x. RIGGS, R. D., SLACK, D. A. & FULTON, J. P., 1956.—“Meadow nematode and its relation to decline of strawberry plants in Arkansas.” **46** (1), 24.

(29s) In green-house and field experiments Nemagon, in dosages up to 10 gal. per acre, did not penetrate non-rotted tomato roots or grape-vine roots in sufficient amount to kill *Meloidogyne incognita* var. *acrita*.
R.T.L.

(29t) Brown cysts of *Heterodera rostochiensis* from the roots of the resistant lines of *Solanum andigenum*, *S. vernei* and *S. sucrense* and from the susceptible potato variety Katahdin were stored for ten months. When placed in potato root diffusate proportionately more of the Katahdin cysts produced larvae and in greater numbers than those from the resistant species. In a few instances abundant larvae hatched from adult females taken from resistant lines of *S. andigenum* and *S. vernei*.
R.T.L.

(29u) As young cherry trees on light, well drained soil had made very poor growth with a witches-broom type of root development planting sites were individually treated with dichloropropene at 450 lb. per acre six weeks before trees were planted. Twenty-one months later there were about 29 times as many *Pratylenchus penetrans* in the roots of the controls as in the treated trees. In a similar experiment in the following year there were 50 times more in the controls than in the treated trees. *Xiphinema* sp. in the soil was also destroyed by the fumigant but there were few even in the untreated soil.
R.T.L.

(29v) In certain Red River deposited soils in Louisiana which are planted mainly with cotton an undescribed species of *Trichodorus* is abundant. From pure populations established on maize growing in sterilized soil it was found that the nematode propagated abundantly on the cotton Coker 100 WR without affecting its stand, height or green weight but the green weight of the variety Deltapine 15 was reduced. The roots of maize and soya beans showed little or no injury although the eelworm propagated abundantly. The worms increased little and showed no root injury on sweet potatoes.
R.T.L.

(29w) Most field corn and sweet corn varieties are susceptible to *Pratylenchus* spp., *Trichodorus* sp., *Belonolaimus gracilis*, *Xiphinema* spp. and *Helicotylenchus* sp. Of these *Trichodorus* and *Pratylenchus* are among the most damaging in Florida and Alabama. In Maryland *Pratylenchus* spp. are of major importance on maize. In Wisconsin eelworm damage is not as severe as in the southern States.
R.T.L.

(29x) *Pratylenchus coffeae* is associated with black root in strawberry plants. The roots of plants grown in relatively heavy soils had the highest eelworm populations. There is a seasonal increase of *P. coffeae* populations in strawberry roots from less than 1,000 per gm. of root in winter to a maximum of 14,000 per gm. of root in May followed by a decrease in summer and autumn. Soil studies revealed a build up of population with each increase of temperature from 75°F. to 92°F.
R.T.L.

29—Phytopathology (cont.)

- †y. SKOTLAND, C. B., 1956.—“Life history and host range of the soybean cyst nematode.” **46** (1), 27.
- †z. TARJAN, A. C. & CHEO, P. C., 1956.—“Nematocidal efficacy of some intermediate-numbered carbon fatty acids.” **46** (1), 28–29.
- †ba. WILSON, J. D., 1956.—“Control of root-knot on carrot, celery, and onion in muck soil by EDB and D-D.” **46** (1), 31.
- †bb. WINSTEAD, N. N. & SKOTLAND, C. B., 1956.—“Eradicant treatments for narcissus bulbs and gladiolus corms harboring soybean nematode cysts.” **46** (1), 31.
- bc. HARE, W. W., 1956.—“Resistance in pepper to *Meloidogyne incognita acrita*.” **46** (2), 98–104.
- bd. HOLDEMAN, Q. L., 1956.—“The effect of the tobacco stunt nematode on the incidence of Fusarium wilt in flue-cured tobacco.” **46** (2), 129.
- be. STEWART, R. N. & SCHINDLER, A. F., 1956.—“The effect of some ectoparasitic and endoparasitic nematodes on the expression of bacterial wilt in carnations.” **46** (4), 219–222.

(29y) When roots of soya bean seedlings were inoculated with second-stage larvae of *Heterodera glycines* mature males were found 14 days and second generation larvae 21 days later. This suggests that five generations could be produced on a soya bean crop in one season in North Carolina. In green-house studies on host range 39 plant species were inoculated but reproduction occurred only in *Glycine max*, *G. ussuriensis*, *Phaseolus vulgaris*, *P. angularis* and on two new hosts, viz., *Lespedeza stipulaceae* and *Vicia sativa*. R.T.L.

(29z) Undecylenic (10-undecenoic) acid at 1,000 p.p.m. *in vitro* is extremely effective against *Panagrellus redivivus*. When cysts of *Heterodera tabacum* containing viable eggs were immersed for 30 minutes in 2% aqueous emulsion of undecylenic acid and then dried for seven days and placed in 0.01% picric acid larval emergence was completely suppressed. 2% of pelargonic (nonanoic) acid also completely suppressed hatching. R.T.L.

(29ba) As spring application of ethylene dibromide and D-D mixture failed to give worth-while control of *Meloidogyne hapla* on carrots in muck soil the soil was treated in the autumn and carrots, celery and onions were planted in the following spring. The carrots gave the largest crop and celery only slightly less. Onions showed the smallest yield. R.T.L.

(29bb) *Heterodera glycines* has so far been found in only a small area in south-eastern North Carolina. As soya beans are often grown there in rotation with gladiolus and narcissus the cysts might be disseminated by corms and bulbs. A non-phytotoxic treatment to kill unhatched larvae in cysts was therefore sought. It was found that 0.5% formalin at 45°C. for three or four hours and hot water at 48°C. for thirty minutes killed unhatched larvae. A thirty-minute pre-storage steep of the corms and bulbs, when harvested, in Dowicide B (85% sodium 2, 4, 5-trichlorophenoxide) 3–100 killed the unhatched larvae and gave effective control of Fusarium rot. R.T.L.

(29bc) In green-house tests of 162 varieties and strains of pepper (*Capsicum frutescens* L.) for resistance to the root-knot nematode *Meloidogyne incognita* var. *acrita*, four were found to be highly resistant, 14 moderately resistant and 135 susceptible. The highly resistant varieties were all small-fruited, hot peppers. Some of the susceptible varieties were further tested on a large scale in a search for resistant individuals. A few resistant plants found were selfed but all progeny were susceptible. M.T.F.

(29bd) Data are presented showing that the presence of *Tylenchorhynchus claytoni* attacking the roots of wilt-susceptible tobacco variety Oxford 1–181, greatly increased the incidence of wilt caused by *Fusarium oxysporum*. J.B.G.

(29be) Carnation cuttings potted in sterilized soil were inoculated with *Meloidogyne hapla*, *M. javanica*, *M. incognita*, *M. incognita* var. *acrita*, *M. arenaria* and the ecto-parasites *Helicotylenchus nanmus*, *Xiphinema diversicaudatum* and *Diritylenchus* sp. One week later a suspension of *Pseudomonas caryophylli* was poured on the soil and a temperature of about 32°C. was maintained. One series of pots of cuttings was set up with (i) nematodes only.

29—Phytopathology (cont.)

- ††bf. MOUNTAIN, W. B. & BENEDICT, W. G., 1956.—“The association of *Rhizoctonia solani* and nematodes in a root rot of winter wheat.” **46** (4), 241–242.
- ††bg. SHERF, A. F. & STONE, K. W., 1956.—“Field control of root knot nematode in onion muck by the use of fumigants.” **46** (4), 242.

(ii) bacteria only and (iii) nematodes and bacteria and another series was set up in which the cuttings were (i) root wounded mechanically and (ii) root wounded with the addition of bacteria. A third series was used as controls. Mechanical root wounding had no direct effect but increased the wilting when bacteria were present. All the *Meloidogyne* species and *H. nannus* increased the rates of wilting in the presence of bacteria. In the absence of bacteria only *M. incognita* var. *acrita* did so. *X. diversicaudatum* with and without bacteria had no effect on the rate of wilting but when *Ditylenchus* was added this was decreased in the presence of bacteria. It is concluded that the significant role of the nematodes was to provide wounds for the entry of the bacteria.

R.T.L.

(29bf) In root rot of winter wheat *Rhizoctonia solani* and *Pratylenchus minyus* were found in close and constant association. Their combined effect on the growth of the wheat was almost twice that of each pathogen alone.

R.T.L.

(29bg) Experimental plots in New York muck soils heavily infested with root-knot nematodes were injected with D-D mixture at 40 gal. per acre, Dowfume W-85 and N-869 at 25 gal. per acre. The subsequent yield of onions per acre was 53,090 lb. after D-D, 49,636 lb. after Dowfume W-85, and 42,242 lb. after N-869. The rate from untreated plots was 37,030 lb. per acre. Dowfume W-85 caused some delay in growth and maturity with improper sizing of the bulbs.

R.T.L.

30—Plant Disease Reporter.

- a. JENKINS, W. R., TAYLOR, D. P. & ROHDE, R. A., 1956.—“A preliminary report of nematodes found on corn, tobacco, and soybean in Maryland.” **40** (1), 37–38.
- b. MANKAU, G. R. & LINFORD, M. B., 1956.—“Soybean varieties tested as hosts of the clover cyst nematode.” **40** (1), 39–42.
- c. GOHEEN, A. C. & BRAUN, A. J., 1956.—“Some parasitic nematodes associated with wild strawberry plants in woodlands in Maryland.” **40** (1), 43.
- d. BAILEY, J. S., 1956.—“Does the root-knot nematode (*Meloidogyne* sp.) thrive in the roots of strawberry plants in Massachusetts?” **40** (1), 44.
- e. HOLLIS, J. P. & FIELDING, M. J., 1956.—“Culture of *Dorylaimus ettersbergensis* in vitro.” **40** (1), 44.
- f. MILLER, P. M., 1956.—“Control of black root rot of strawberries with nematocide-fungicide combinations.” **40** (1), 45–47.
- g. CHAPPELL, W. E. & MILLER, L. I., 1956.—“The effects of certain herbicides on plant pathogens.” **40** (1), 52–56.
- h. GOHEEN, A. C. & SMITH, J. B., 1956.—“Effects of inoculation of strawberry roots with meadow nematodes, *Pratylenchus penetrans*.” **40** (2), 146–149.
- i. LUCAS, G. B. & KRUSBERG, L. R., 1956.—“The relationship of the stunt nematode to Granville wilt resistance in tobacco.” **40** (2), 150–152.
- j. LEYENDECKER, P. J., SMITH, A. L., COOPER, W. E. & LETT, L., 1956.—“Reduction in yield of cotton caused by diseases in 1955.” **40** (2), 153–155.
- k. WHITEHEAD, M. D., MATSON, A. & WILLIAMS, L., 1956.—“Severe root-knot nematode infection of the soybean variety Lee.” **40** (3), 176.
- l. WELLS, J. C. & WINSTEAD, N. N., 1956.—“The reaction of twenty gladiolus varieties to five root-knot nematode species.” **40** (3), 177–178.
- m. CHAPMAN, R. A., 1956.—“Plant parasitic nematodes associated with strawberries in Kentucky.” **40** (3), 179–181.
- n. FERRIS, V. R., MAI, W. F. & LYON, H. H., 1956.—“A new method for counting golden nematode cysts.” **40** (3), 182–183.

††Abstract of paper presented at the 11th Annual Meeting of the Northeastern Division of the American Phytopathological Society, West Springfield, Mass., November 3–4, 1955.

- o. JENKINS, W. R., TAYLOR, D. P. & ROHDE, R. A., 1956.—“Nematodes associated with clover, pasture, and forage crops in Maryland.” 40 (3), 184-186.
- p. POTTER, H. S. & MORGAN, O. D., 1956.—“Nemagon control of root-knot nematode on strawberries.” 40 (3), 187-189.
- q. ROHDE, R. A. & JENKINS, W. R., 1956.—“A previously unreported species of *Trichodorus* in Maryland.” 40 (3), 259.

(30a) Results of a survey made in 1955 in Maryland by samples of soil being taken from 328 fields growing maize (143), tobacco (111) and soya bean (74) are presented in tabular form. Twenty-five genera of nematodes were scored, of which *Dorylaimus* occurred in 90% of samples, *Tylenchorhynchus* in 54%, *Ditylenchus* in 51%, *Pratylenchus* in 45% and *Xiphinema* in 41%. *Meloidogyne* occurred in 3.7% but the authors claim that this does not give a true picture.

J.B.G.

(30b) Mankau & Linford grew 27 varieties of soya bean for five to six weeks in soil heavily infested with *Heterodera schachtii* var. *trifolii* from Illinois. The roots were then carefully examined for cysts and, by a staining and clearing technique, for larvae. The larvae apparently entered the roots of all varieties freely but in 19 there was no further development. In six varieties there were a very few, poorly developed females containing no eggs, while in the varieties Earlyana and Dunfield there were small numbers of females and young cysts with eggs and many more females which had failed to develop. There were no eggs deposited in egg sacs. Many larvae were found in the soil in which the plants had been growing. None of these varieties can thus be regarded as a suitable host for the Illinois population of clover cyst nematodes.

M.T.F.

(30c) Sampling 12 newly cleared areas of land which had been forest for at least 30 years, the authors found, on the roots of *Fragaria virginiana*, *Helicotylenchus nannus* in seven cases, *Xiphinema* and *Criconeimoides* in five, *Pratylenchus penetrans* in four, *Criconeima* in three and *Meloidogyne hapla*, *Tylenchorhynchus*, *Hoplolaimus* and *Paratylenchus* each in one case. Their wide distribution in wooded areas in Maryland suggests the indigenous nature of the eelworms although the evidence is only circumstantial.

J.B.G.

(30d) Observations made on strawberry plants heavily galled with root-knot eelworm which were planted in the field in the Cape Cod peninsula, showed that galls on the old roots did not appear to increase and very few developed on the new roots between the time the plants were planted in the spring and September. The roots presented a similar appearance the following spring. This suggests that the nematodes do not thrive in Massachusetts although some live over winter.

M.T.F.

(30e) *Dorylaimus ettersbergensis* de Man, 1885 is reported for the first time as having been successfully cultured in petri dishes of aqueous agar. The nematode reproduced rapidly in culture, feeding on the conidia of a monileaceous fungus (? *Cephalothecium*) and on the non-motile spores of a ciliate protozoan, *Drepanomonas*. The nematode did not feed on fungal hyphae or on the motile protozoa.

J.B.G.

(30f) Field experiments were carried out to determine the effect on black root rot off strawberries of the application to the soil of fungicides, nematicides and combinations of the two. The applications were made shortly before the plants were planted in May and ratings for black root rot were made at the end of October according to the condition of the aerial parts of the plants. The two treatments giving best results were ethylene dibromide (Dowfume W-85) at 6 gal. per acre plus Terrachlor (pentachloronitrobenzene, 20% active ingredient) at 30 lb. per acre, and Vapam (*n*-methyl dithiocarbamate dihydrate) at 25 lb. per acre. Terrachlor alone, parathion and a fungicide called Thioneb were next in order of efficacy. It is suggested that in a disease such as black root rot the damage due to nematodes and fungi may be independent and a treatment must control both to give maximum control of the root rot.

M.T.F.

(30g) Among the plant pathogens investigated was *Belonolaimus gracilis*. Placing adults in solutions of various concentrations of the herbicides showed that isopropyl-N-(3-chlorophenyl) carbamate, dinitro-*o*-sec-butylphenol and sodium pentachlorophenate killed all

nematodes at 100 p.p.m. The last was partially effective at 1 p.p.m. per 48 hours and in the field was effective to a considerable extent in controlling *B. gracilis* as estimated by the reduction in the number of sting punctures on the fruits of peanut.

J.B.G.

(30h) *Pratylenchus penetrans* invaded and reproduced in strawberry roots. When nematode-free plants were grown in soil inoculated with heavy numbers of *P. penetrans* stunting occurred and the roots showed typical symptoms of black root rot.

J.B.G.

(30i) By inoculating pots of Dixie Bright 101 tobacco seedlings with *Tylenchorhynchus claytoni* and *Xanthomonas solanacearum* separately and together, the authors show that the presence of the eelworm does not increase the severity of the bacterial wilt attack on the tobacco. Wilt is greatly increased by the attack of *Meloidogyne* sp. which, in feeding, reaches the xylem. *T. claytoni* does not reach the xylem in feeding; this and the poor stunted root system caused by *T. claytoni* are suggested as reasons for the lack of increased severity. Optimum conditions for wilt development occur in vigorous, actively growing plants.

J.B.G.

(30j) In a table showing the losses of cotton caused by various diseases, there is one loss of 1.35% caused by *Meloidogyne* sp. in 1955. Over a period of four years, 1952-55 inclusive, there was an average loss of 212,772 bales of cotton per year [there is nothing to indicate what percentage this represents].

J.B.G.

(30k) Although the soya bean variety Lee is considered to have relatively high resistance to various diseases, including infection by *Meloidogyne incognita*, it was found to be severely infected with *M. arenaria* in a soya bean nursery at Hornersville, Dunklin County, Missouri.

R.T.L.

(30l) As root-knot nematodes give rise to one of the major diseases of gladiolus in south-eastern North Carolina, the relative susceptibility of 20 named varieties to five species of *Meloidogyne* was tested under green-house conditions. The results are tabulated. All the varieties were resistant to *M. hapla*. The variety Elizabeth the Queen had the highest degree of resistance to all five species but was not immune. Most of the varieties were susceptible to *M. incognita* and *M. incognita* var. *acrita* which are the most prevalent species in the major gladiolus areas.

R.T.L.

(30m) The number of fields in Kentucky in which plant-parasitic nematodes were associated with strawberries is tabulated. No relation was observable between the number of species or the numbers of nematodes in various combinations of species in the same field and the condition of the plants. Owing to the wide-spread association of species of *Tylenchorhynchus*, *Xiphinema*, and *Paratylenchus* with strawberries they are to be regarded as potentially important pathogens in Kentucky.

R.T.L.

(30n) For more accurate counting of *Heterodera* cysts in soil samples a small boat is made from a transparent plastic material. The length of the boat is determined by the diameter of the petri dish in which it is placed to retain any spilled cyst material; the width should be that of the microscopic field used. The sides and ends slope inwards at the base; the edges of the sides of the bottom piece extend outwards about 2 mm. to ensure stability. Alternate areas along the top edges, each of one microscopic field in length, are coloured with bright nail polish. When cyst-containing material washed from dry soil samples is floated on water in the boat most of the cysts collect around the edges. As the boat is slowly drawn past the field of vision the cysts can be counted quickly and accurately.

R.T.L.

(30o) Soil and roots from the cover, pasture and non-grass forage crops were collected from 368 fields throughout the State of Maryland whether or no these showed nematode injury and examined for plant-parasitic and potentially plant-parasitic nematodes. On fields growing grasses (including wheat, barley, rye and oats) *Xiphinema* spp. occurred in 29% of the samples, *Tylenchorhynchus* spp. in 24%, *Pratylenchus* spp. in 17%, *Paratylenchus* spp. in 10% and *Rotylenchus* spp. and *Helicotylenchus* spp. in 8%. *Pratylenchus* occurred in 6 out of

85 wheat samples. On non-forage crop fields *Xiphinema* spp. occurred in 43%, *Pratylenchus* spp. in 33%, *Tylenchorhynchus* spp. in 33%, *Paratylenchus* spp. were present in 20 out of 116 fields. The genera *Dorylaimus*, *Ditylenchus*, *Aphelenchus* and *Aphelenchoides* were also present in large numbers some probably as predators, saprozoites, and fungus and bacteria feeders. R.T.D.

(30p) Nemagon (1,2-dibromo-3-chloropropane) gave good control of *Meloidogyne hapla* in light sandy land near Salisbury, Maryland, where it was responsible for root-knot in strawberries. The fumigant was applied either as liquid at 0.4 gal. and 0.8 gal., diluted with Esso-Varsol solvent, per acre or in a 5% dry granular material of active compound adsorbed on attapulgite clay particles at 140 lb. and 280 lb. per acre. The dry material was pre-mixed with fertilizer and applied to a depth of four inches on either side of roots in bands approximately eight inches apart, one month after planting. The liquid treatments were applied by a three-gallon gravity feed dispenser behind the fertilizer hopper. The treatments did not cause any immediate or delayed toxic effect. R.T.D.

(30q) *Trichodorus primitivus* has been found, for the first time in Maryland, in soil from about the roots of young mimosa plants, *Albizia julibrissin*. R.T.D.

31—Proceedings of the Helminthological Society of Washington.

- a. LUCKER, J. T., 1956.—"The structure, synonyms and hosts of *Physaloptera mexicana* (Nematoda: Physalopteridae)." 23 (1), 1-4.
- b. HARGIS, Jr., W. J., 1956.—"Monogenetic trematodes of Gulf of Mexico fishes. Part VIII. The superfamily Diclidophoroidea Price, 1936. (Continued)." 23 (1), 5-13.
- c. MASSEY, C. L., 1956.—"Nematode parasites and associates of the Engelmann spruce beetle (*Dendroctonus engelmanni* Hopk.)." 23 (1), 14-24.
- d. LANDRAM, J. F. & CAUTHEN, G. E., 1956.—"Some experiments on the effect of low level phenothiazine on the development of *Ostertagia ostertagi* larvae in bovine feces." 23 (1), 24-28.
- e. GRUNDMANN, A. W., 1956.—"A new tapeworm, *Mesocostoides carnivoricolus*, from carnivores of the Great Salt Lake Desert region of Utah." 23 (1), 26-28.
- f. RIGGIN, Jr., G. T., 1956.—"A note on *Ribeiroia ondatrae* (Price, 1931) in Puerto Rico." 23 (1), 28-29.
- g. SANTMYER, P. H., 1956.—"Studies on the metabolism of *Panagrellus redivivus* (Nematoda: Cephalobidae)." 23 (1), 30-36.
- h. HABERMANN, R. T. & WILLIAMS, Jr., F. P., 1956.—"The effect of antibiotics, phenothiazine, sodium fluoride, and the combined action of these drugs, in the removal of oxyuriasis from mice." 23 (1), 36-39.
- i. DOUVRES, F. W., 1956.—"*Rictularia lucifugus*, n.sp. (Nematoda: Thelaziidae), from the little brown bat, *Myotis lucifugus lucifugus* (Le Conte, 1831)." 23 (1), 40-47.
- j. FIELDING, M. J., 1956.—"*Tylenchorhynchus martini*, a new nematode species found in the sugarcane and rice fields of Louisiana and Texas." 23 (1), 47-48.
- k. CHUTE, R. M., 1956.—"The dual antibody response to experimental trichinosis." 23 (1), 49-58.
- l. WIESER, W., 1956.—"The attractiveness of plants to larvae of root-knot nematodes. II. The effect of excised bean, eggplant, and soybean roots on *Meloidogyne hapla* Chitwood." 23 (1), 59-64.
- m. GOLDBERG, A. & RUBIN, R., 1956.—"Survival on pasture of larvae of gastrointestinal nematodes of cattle." 23 (1), 65-68.
- n. MARQUARDT, W. C. & SENGER, C. M., 1956.—"Lungworms in the Bighorn sheep of Montana." 23 (1), 68-69.
- o. BOYD, E. M., 1956.—"Two new species of stomach worms (Nematoda: Spiruroidea) from the blue jay, *Cyanocitta cristata* L." 23 (1), 70-74.
- p. RASKI, D. J., 1956.—"*Sphaeronema arenarium*, n.sp. (Nematoda: Criconeematidae), a nematode parasite of salt rush, *Juncus leserii* Boland." 23 (1), 75-77.
- q. CHITWOOD, B. G., 1956.—"A revision of the genus *Haliplectus* Cobb, 1913." 23 (1), 78-84.
- r. TARJAN, A. C., 1956.—"Known and suspected plant-parasitic nematodes of Rhode Island. II. *Xiphinema americanum* with notes on *Tylencholaimus brevicaudatus* n. comb." 23 (1), 88-94.

(31a) From a re-examination of the co-types of *Physaloptera mexicana* Caballero, 1914, Luckner concludes that it is a valid name with *P. buteonis* Morgan, 1948 and the *P. subalata* Schneider, 1866 of Seurat, 1914 as synonyms. The characteristic feature of the male *P. mexicana* is the presence of five pairs of stalked lateral genital papillae and a high ratio of difference between the lengths of the spicules. R.T.D.

(31b) The systematics of Diclidophoroidea are discussed. The diagnosis of Discocotyliidae is emended and Vallisiinae is consequently transferred to Gastrocotyliidae. *Tagia* is redefined, *Kuhnia otolithis* is placed in this genus as *Tagia otolithis* (Yamaguti, 1953) n.comb. and two species from Florida are added, viz., *T. bairdiella* n.sp. from the gills of *Bairdiella chrysura* and *T. cupida* n.sp. from the gills of *Orthopristis chrysopterus*. *Hemitiagia galapagensis* is partially redescribed.
R.T.L.

(31c) Massey gives brief descriptions of four nematodes parasitic in *Dendroctonus engelmanni* and lists eight named and several unspecified associates taken from the beetle's egg and larval galleries. *Sphaerularia dendroctoni* n.sp. is smaller than *S. bombi*. The tail is more conical and the cells of the protruded vagina are more closely spaced. *Ektaphelenchus obtusus* n.sp. from the galleries and from the body-cavity is differentiated from *E. hylastophilus cunicularii* and *E. ateri* by the absence of basal knobs on the spear. The vulva is placed more anteriorly than in *E. typographi*.
R.T.L.

(31d) Phenothiazine effectively prevented the development of the free-living stages of *Ostertagia ostertagi* when a dose of 0.5 gm. to a calf 5½ months old and 1 gm. to a calf 7½ months old were fed daily. The drug took effect within 24 hours and the effect ceased within 48 hours after its administration was stopped.
R.T.L.

(31e) *Mesosestoides carnivoriculus* n.sp. from *Taxidea taxus taxus*, *Canis latrans* and *Lynx rufus pallescens* has 25 to 35 testes and the yolk glands are close together whereas in *M. variabilis* the testes number 90 to 110 and the yolk glands are lateral and separated and the paruterine structure is larger and nearer the posterior border. The rims of the suckers of *M. carnivoriculus* are notched anteriorly but posteriorly in *M. corti* which is a parasite of rodents.
R.T.L.

(31f) Metacercariae were found in *Lebistes reticulatus*, *Poecelia vivipara* and tadpoles exposed to *Cercaria marini* shed by *Australorbis glabratus*. When fed to a parakeet and a pigeon the adults proved to be *Ribeiroia ondatrae*. Natural infections were found in the green heron *Butorides virescens* at Trujillo Alto and near San Juan. The parasites caused deep lesions in the proventriculus mucosa.
R.T.L.

(31g) Observations on *Panagrellus redivivus* showed that there is a direct correlation between metabolic activity and response to chemical treatment and that the proportion of the metabolic energy consumed in oscillatory movement is comparatively small.
R.T.L.

(31h) Tests on mice showed that phenothiazine was most effective, antibiotics less effective and sodium fluoride ineffective in expelling *Aspiculuris tetraptera* and *Syphacia obvelata*. The addition of aureomycin, bacitracin or terramycin to phenothiazine did not increase its efficacy.
R.T.L.

(31i) *Rictularia lucifugus* n.sp. from *Myotis l. lucifugus* from caves in West Virginia differs from other species in the number of combs and spines which total 77 pairs (of which 32 pairs of combs and three pairs of spines are anterior to the vulva), the maximum measurements of the combs and spines and the distance of the last spine from the posterior end. Douvres does not believe it feasible to accept the grouping of the species of this genus proposed by Dollfus & Desportes, owing to the variability within a single species.
R.T.L.

(31j) *Tylenchorhynchus martini* n.sp. is wide-spread in the rice-growing soils of Louisiana and Texas and the sugar-cane fields of Louisiana. It differs from *T. claytoni* in that the body annulations are simple, there is a slight constriction behind the lip region and the female tail is blunt.
R.T.L.

(31k) Chute, experimenting on the response of adult and larval *Trichinella spiralis* in immune serum, has been unable to confirm that there are qualitative antigenic differences between adults and larvae; he considers that the antigenic differences, which do exist, are quantitative. In sera of rats and rabbits which had been reinfectd the percentages of both adults and larvae which showed oral precipitates increased. Sera from rabbits injected with

two larval antigen preparations caused responses to both adults and larvae, with an indication that more adults than larvae reacted. Immunization of rats with killed whole larvae resulted in the recovery post mortem of significantly fewer adults than in the control rats: immunization with secretions and excretions had a similar effect and significantly fewer larvae were recovered from rats which had received a series of injections of secretions and excretions than from uninjected rats. Although the larvae recovered from immunized rats were smaller than those from control rats the difference in size was not statistically different. S.W.

(31l) Although beans are very susceptible to *Meloidogyne hapla*, excised distal portions of the root of the bean *Phaseolus vulgaris* var. Pinto were found to have a decidedly repellent effect on the larvae. The length of the tested piece had no influence on the effect. Excised root portions of the garden eggplant *Solanum melongena* showed an enormous random variation, some being repellent, some neutral and others attractive. These differences are interpreted as the result of interplay between a repellent agent arising from the decay or breakdown of the root and an attractive agent present in the living plant. Variations in the intensity of the attractive agent can be expressed in terms of different speeds of breakdown or of different amounts present in the root before excision. R.T.L.

(31m) Goldberg & Rubin have studied the survival of nematode larvae on plots contaminated by calves infected with all or some of the following nematodes: *Haemonchus contortus*, *Cooperia* sp., *C. curticei*, *C. punctata*, *C. oncophora*, *Trichostrongylus axei*, *T. colubriformis*, *Ostertagia ostertagi*, *Oesophagostomum radiatum*, *Trichuris ovis* and *Nematodirus filicollis*. At intervals after the contamination period an uninfected calf was put on to one of the plots, allowed to graze for about a fortnight and then housed for a period to allow the parasites to develop. Post-mortem examination of these calves showed that the numbers of larvae on the pasture declined sharply during the first two months. Only *Cooperia oncophora*, *Ostertagia ostertagi*, *Nematodirus filicollis* and *Trichuris ovis* survived the heat and dryness of the summer and the cold of the following winter. Data on the climatic conditions during the experimental period are given. S.W.

(31n) Of 19 Bighorn sheep from three geographically isolated herds in Montana only two were free from lungworms. Adult *Protostrongylus rushi* were found in the bronchioles of seven and lesions due to infection with another species, probably *P. stilesi*, were present in thirteen. There was no evidence of pneumonia or extensive gross pathological change in any of the animals. R.T.L.

(31o) *Microtetrameres spiculata* n.sp. and *Cheilospirura cyanocitta* n.sp. are described and figured from the blue jay *Cyanocitta cristata* in New England. *M. spiculata* inhabits the proventriculus. It is very similar to *M. corax* but the ratio of the left spicule to body length is 1:0.85 whereas in *M. corax* it is 1:2. It also differs in many of the body components being smaller. *Cheilospirura cyanocitta* lies between the tunics of the gizzard. Its most characteristic feature is the short length of the left spicule which measures 315μ to 370μ . The averaged cordon length in the female *C. cyanocitta* is $1,233\mu$. The vulva has a central position and the ovum is $42\mu \times 24\mu$. R.T.L.

(31p) *Sphaeronema arenarium* n.sp. is ectoparasitic on the roots of the salt rush *Juncus leseurii* in California and does not form colonies. The female is coiled in a gelatinous mass in which are ova and larvae. The specific characters are the elongate, tightly coiled body of the female and her conical and terminally rounded tail, while the male tail is sharply pointed. R.T.L.

(31q) Examination of Cobb's original description and figures of *Haliplectus pellucidus*, and of his unpublished sketches, proves that the genus belongs to the Leptolaimidae. The generic diagnosis is revised and three new species are added from Cobb's unpublished notes, viz., *H. floridanus* Cobb, n.sp. from mangrove swamp soil, Long Key, Florida, *H. conicephalum* Cobb n.sp. from the roots of plants in a salt marsh, Penzance, Woods Hole and *H. dorsalis* Cobb n.sp. from the edge of a salt marsh east of Falmouth Heights, Mass. Chitwood adds a

description of *H. bickneri* n.sp. from soil around roots of *Schinus* sp. A key is given to the five species which now form the genus. In *H. conicephalum* and *H. dorsalis* the amphids are slightly more than the diameter of the head from the anterior end. Only the female of the former and the male of the latter species are known. In *H. pellucidus*, *H. floridanus* and *H. bickneri* the amphids are distinctly more than a head's diameter from the anterior end. The male pre-anal supplements in *H. floridanus* number six, in *H. bickneri* four and in *H. pellucidus* none.

R.T.L.

(31r) Attempts to colonize *Xiphinema americanum* in a green-house in order to obtain evidence of a pathogenic role were not successful as the *Xiphinema* populations declined possibly through the considerable fluctuations of temperature and the abnormal water relationships to which the green-house-grown experimental plants were subjected. The paper includes a description and illustrations of *X. americanum* obtained from bent-grass and American elm. A note is appended to the effect that (i) the figures of *Longidorella parva* which appeared in Tarjan's earlier paper "Known and suspected plant-parasitic nematodes of Rhode Island. I" erroneously carried the legend for *Discomyctus brevicaudatus* and vice versa and (ii) the form then identified as *L. parva* is *Dorylaimus microdorus* and as *Discomyctus brevicaudatus* is more closely related to *Tylencholaimus* it is now designated *Tylencholaimus brevicaudatus* n.comb.

R.T.L.

32—Rivista di Parassitologia.

- a. STARKOFF, O., 1956.—"Su di un esemplare triedro di *Taenia saginata* Goeze, 1782. Rassegna dei casi finora noti." 17 (1), 11-20. [English summary p. 18.]
- b. BRONZINI, E., 1956.—"Segnalazione di alcuni parassiti rari tra i gatti randagi di Roma." 17 (1), 21-25. [English summary p. 25.]
- c. CORBO, S., 1956.—"In merito all'azione del cloroamfenicolo verso l'enterobiasi." 17 (1), 59-60.

(32a) A trihedral example of *Taenia saginata* is reported from a resident in Rome. The rostellum carried six suckers. Instances previously recorded in the literature are briefly reviewed.

R.T.L.

(32b) The occurrence of *Echinocasmus perfoliatus* and *Ollulanus tricuspis* in stray cats in Rome is reported for the first time. The specimens of *O. tricuspis* differed in some respects from Travassos' description but the differences were not considered to be of taxonomic significance.

R.T.L.

(32c) Three children were cured of *Enterobius* infection by the daily use for seven days of chloramphenicol suppositories each containing 750 mg. When only 500 mg. was used it was not very effective.

R.T.L.

33—Science. Lancaster, Pa.

- a. WIESER, W., 1956.—"Effect on *Meloidogyne hapla* of excised tomato roots treated with alpha-methoxyphenylacetic acid." 123 (3192), 374-375.

(33a) In a previous paper the author showed that larvae of *Meloidogyne hapla* tend to move towards excised tomato roots in damp sand when the root is taken from 2 mm. to 8 mm. from the tip; they are repelled by the first 2 mm. behind the tip. Tests have now been made using pieces of root cut from tomatoes treated with alpha-methoxyphenyl-acetic acid (MOPA) which causes growth responses and has been shown to move downwards in tomato plants and to be excreted through the roots. The roots from MOPA-treated plants proved less consistent than those from untreated plants although some were attractive, especially those taken over 8 mm. from the tip. No repellent effect was observed from the first 2 mm. of root. It is suggested that the attractiveness of a length of root depends on an interplay between an attractive agent and a repellent agent represented by MOPA or produced in its presence. The variation in effect between MOPA-treated and untreated roots is significantly different.

M.T.F.

34—Tijdschrift over Plantenziekten.

- a. SEINHORST, J. W., 1956.—“Kunnen ‘kroef’ percelen opgespoord worden door grondmonsteronderzoek?” 62 (1), 1-4. [English summary p. 4.]
- b. SEINHORST, J. W., KLINKENBERG, C. H. & MEER, F. A. v.d., 1956.—“Aantasting in frambozen door *Pratylenchus penetrans* (Cobb) Sher et Allen.” 62 (1), 5-6. [English summary p. 6.]
- c. KORT, J. & S'JACOB, J. J., 1956.—“Een oriënterend onderzoek naar het voorkomen van en de schade veroorzaakt door het havercystenaaltje (*Heterodera avenae*=*H. major*) in 1955.” 62 (1), 7-11. [English summary p. 11.]

(34a) By comparing the numbers of *Pratylenchus dipsaci* in samples of soil with the degree of infestation shown by onions grown on that soil, Seinhorst shows that very few eelworms per 500 gm. of soil may cause serious damage to onions and also to rye. He points out that the larger the sample the better the chance of finding nematodes. When they occur in a sample it is recommended that onions should not be grown in the field. J.B.G.

(34b) *Pratylenchus penetrans* proved to be responsible for poor growth of raspberries; strawberries were also attacked. Raspberries showed stunted growth, poor root system with black lesions or dead roots and a general absence of fine feeder roots. Raspberries should not follow raspberries, strawberries or after susceptible fruit trees except it be shown that the site is free or nearly so from *P. penetrans*. J.B.G.

(34c) As a result of a survey for oat eelworm (*Heterodera avenae*=*H. major*) this nematode has been found in 78% and 96%, respectively of the fields investigated in two different areas in Holland. Oat crops were examined during the growing season and a positive correlation was found between the damage to the crops and the infestation in the soil. The water supply has an important influence on this correlation. The clover eelworm, *H. trifolii*, was present in 6.5% and 32% of the samples in two areas. When oat eelworm cysts were kept dry in plastic cavity slides for one to three weeks there was a decrease of 52% in viable cysts and larvae. M.T.F.

35—Transactions of the American Microscopical Society.

- a. HANSEN, M. F. & SHIVNANI, G. A., 1956.—“Comparative morphology of infective nematode larvae of Kansas beef cattle and its use in estimating incidence of nematodiasis in cattle.” 75 (1), 91-102.
- b. CIORDIA, H., 1956.—“Cytological studies of the germ cell cycle of the trematode family Bucephalidae.” 75 (1), 103-116.
- c. MARTIN, W. E., 1956.—“The life cycle of *Catantropis johnstoni* n.sp. (Trematoda: Notocotylidae).” 75 (1), 117-128.
- d. HOPKINS, S. H., 1956.—“Two new trematodes from Louisiana, and the excretory system of Bucephalidae.” 75 (1), 129-135.

(35a) Hansen & Shivnani have studied the nematodes parasitizing beef cattle in Kansas and conclude that the generic and usually specific identity of the third-stage larvae can be established on morphological characteristics. They investigated the seasonal incidence by means of larval counts and found that *Haemonchus contortus* predominated throughout the year with a peak in April, *Ostertagia ostertagi* and *Cooperia* sp. were the next most abundant but their larval counts were relatively stable throughout the year, *Oesophagostomum radiatum* was relatively stable except for a sharp rise in June and *Bunostomum*, *Nematodirus* and *Trichostrongylus* showed a high spring trend followed by a gradual diminution. Faecal egg counts gave similar results and because of its relative ease and speed this method is recommended for survey work. The larval count method is more reliable for determining nematodes at the generic or specific level. The larvae of the different species are described and figured and the paper is illustrated by a number of graphs and tables. S.W.

(35b) Ciordia has investigated the germ cell cycle in *Rhipidocotyle papillosum*, one of the trematodes in which Woodhead reported ovaries, testes, maturation divisions, sperm and polar body formation and reduction of chromosome numbers in the larval forms, and has been unable to confirm Woodhead's observations. In the adult oogenesis follows the classical pattern and spermatogenesis results in the formation of 32 spermatozoa about 6 μ long and

without cytoplasmic tails. Larval forms were observed in sections of infected clams, *Lampsilis siliquoidea*. The sporocyst is a hollow structure covered by a thin cuticle; its lumen is lined by a layer of mesenchymal (parenchymal) cells lying axially to a very thin layer of longitudinal and circular muscles; germinal cells with a great affinity for haematoxylin occur in the mesenchymal layer and these produce cercariae by the formation of germinal cysts within the sporocyst wall and by proliferation into the lumen forming large amorphous masses. The redial generation was not observed but it is possible that it might occur at another time of the year. The diploid chromosome number was 12. S.W.

(35c) Martin describes and illustrates *Catatropis johnstoni* n.sp. from chicks experimentally infected with metacercariae from *Cerithidea californica*. The new species differs from all other members of the genus in the absence of lateral ventral glands and the genus is emended to include it. *Catatropis* is now distinguished from *Hofmonostomum* only by the extent of the vitellaria. The growth of *C. johnstoni* in the definitive host is described; eggs are first produced between nine and thirteen days after infection and there is little increase subsequently in body size. It is believed that this species is a blood feeder as similar absorption spectra were obtained for dilute host haemoglobin and an extract of the worms. The rediae, cercariae and metacercariae are described in detail and illustrated. The flame cell formula of the cercariae is $2\{(3+3+3)+(3+3+3)\}=36$. In the adult the excretory system develops diverticula which are not connected to flame cells. Cercariae encyst within about ten minutes of emerging from the snail and the metacercariae are infective immediately after encystment. The eggs may bear more than one filament at each pole and these are believed to be formed from yolk as they stain in the same way as the egg capsules. S.W.

(35d) Hopkins describes and figures *Bucephalus cynoscion* n.sp. and *Bucephaloides caecorum* n.sp. from *Cynoscion nebulosus*. *B. caecorum* is most closely related to *B. southwelli* and *B. sinhai*; it may be distinguished from the former by the anterior sucker which is larger in proportion to the body, the smaller pharynx and the more slender and shorter cirrus pouch and from the latter by the disposition of the uterus. *Bucephalus cynoscion* is distinct from all other species of the genus in that the ovary is situated far in front of the anterior testis and is separated from it by a distance approximately equal to the diameter of the ovary and there appear to be, in most specimens, only five papillae on the anterior sucker. The excretory system of the family is briefly discussed. S.W.

36—Transactions of the Royal Society of Tropical Medicine and Hygiene.

- a. EDESON, J. F. B., WHARTON, R. H. & BUCKLEY, J. J. C., 1956.—"Adult specimens of *Wuchereria* recovered from forest and domestic animals in Malaya." [Demonstration.] 50 (1), 1.
- b. YEH, L. S., 1956.—"Morphological abnormalities in the human liver fluke *Clonorchis sinensis*." [Demonstration.] 50 (1), 2.
- c. YEH, L. S., 1956.—"Testicular abnormalities in some echinostomes." [Demonstration.] 50 (1), 2.
- d. YEH, L. S., 1956.—"Larval *Tentacularia* sp. in the flesh of barracuda fish sold in the market in the West Indies." [Demonstration.] 50 (1), 2.
- e. METTRICK, D. F., 1956.—"Some new host records for *Luttrema monenteron* Price and MacIntosh, 1935, and variations occurring in its morphology." [Demonstration.] 50 (1), 3.
- f. ADAMSON, P. B., 1956.—"*Coenurus* (?) infection of the brain of a European in South Africa." [Demonstration.] 50 (1), 3.
- g. BERTRAM, D. S., 1956.—"Further comparisons of the effects of prolonged continuous exposure and intermittent exposure of cotton-rats to their filarioid parasite." [Demonstration.] 50 (1), 4.
- h. KERSHAW, W. E., JAMISON, D. G., NUGENT, D. & DUKE, B. O. L., 1956.—"Preliminary observations on the depth distribution of the microfilariae of *Onchocerca volvulus* in the skin and its relation to the reservoir of infection to the fly." [Demonstration.] 50 (1), 6.
- i. SILVERMAN, P. H., 1956.—"The infectivity of the hexacanth embryo of *Taenia pisiformis*." [Demonstration.] 50 (1), 7.
- j. SILVERMAN, P. H., 1956.—"Predilection sites for *Cysticercus bovis* in cattle." [Demonstration.] 50 (1), 7.
- k. SILVERMAN, P. H., 1956.—"How does *Cysticercus pisiformis* exert its pathogenic effect?" [Demonstration.] 50 (1), 8.

- l. SILVERMAN, P. H., 1956.—“The longevity of eggs of *Taenia pisiformis* and *T. saginata* under various conditions.” [Demonstration.] 50 (1), 8.
- m. SILVERMAN, P. H., 1956.—“Specific and non-specific *in vitro* serum reactions to active taeniid hexacanth embryos.” [Demonstration.] 50 (1), 8.
- n. MANEELY, R. B., 1956.—“The value of ‘Nonex’ as an embedding medium in vertebrate and invertebrate histology.” [Demonstration.] 50 (1), 9.
- o. WILSON, T., 1956.—“Differences between the microfilariae of *Wuchereria malayi* and *Wuchereria bancrofti* in Giemsa-stained thick blood films.” 50 (1), 54-57.
- p. MCCARTHY, D. D. & FITZGERALD, N., 1956.—“Habit, habitat and hyperfilaria in the epidemiology of filariasis in Western Samoa.” 50 (1), 58-65.
- q. MCCARTHY, D., 1956.—“Pseudo-periodicity in the Pacific variety of *Wuchereria bancrofti*: a study of fluctuations in the density of microfilariae in the peripheral blood of Samoans.” 50 (1), 66-71.
- r. ROBINSON, D. L. H., 1956.—“The behaviour of young and adult *Schistosoma mansoni* in immune serum.” [Correspondence.] 50 (1), 105-106.
- s. ZAHAWI, S. AL & SHUKRI, N., 1956.—“Histopathology of fatal myocarditis due to ectopic schistosomiasis.” 50 (2), 166-168.
- t. NILES, W. J. & SAMARAWICKRAMA, W. A., 1956.—“*Anopheles hyrcanus* var. *nigerrimus* Giles: a possible vector of bancroftian filariasis in Ceylon.” [Correspondence.] 50 (2), 182-183.

(36a) Two kinds of adult *Wuchereria* were collected from monkeys, dog and cat in the lower reaches of the Pahang River, Malaya where *Wuchereria malayi* is highly endemic in man. In the one from the dog and the cat the distal part of the left spicule is less than half its total length and terminates in a simple tip and closely resembles or is identical with the published description of adult *W. malayi*. In the other, from monkey and cat, the distal portion of the left spicule is more than half its total length and terminates in a distinct spatula similar to that of *W. bancrofti*. In both types the microfilariae were indistinguishable from those of *W. malayi*.

R.T.L.

(36e) Mettrick records *Lutztrema monenteron* for the first time in *Turdus merula*, *T. viscivorus* and *Corvus frugilegus* in Hertfordshire: this is the first European record of *L. monenteron*. He considers this to be a valid species, not a synonym of *L. obliquum*. S.W.

(36g) Bertram reports that when cotton-rats were exposed to infection with *Litomosoides carinii* for periods of one to three weeks every two or three months, they showed heavy microfilarial infections of the blood which persisted for many months. When exposed continuously for periods up to six months very low or negative microfilarial densities were observed. S.W.

(36h) In light infections of *Onchocerca volvulus* the microfilariae are most numerous in the superficial parts of the sub-epidermal layer, in moderate infections they are more numerous but occur in the deeper parts of the sub-epidermal layer and in advanced (“burnt out”) infections they are numerous but are still more deeply placed in the dermal layer. The mouthparts of *Simulium damnosum* penetrate only a small distance into the sub-epidermal layer. It is shown that a case of moderate intensity of infection is eight times more effective as a reservoir than a case of light intensity and sixteen times more effective than an advanced case.

S.W.

(36i) Silverman, using *Taenia pisiformis*, shows that a measure of the infectivity of a sample of eggs (or of the susceptibility of a host) can be obtained by comparing the number of cysticercii which develop with the number of potentially infective eggs fed. He has already shown that the number of potentially infective embryos in a suspension of tapeworm eggs can be calculated after treating a sample with hatching solution [for abstract see Helm. Abs., 23, No. 74]. He proposes the following formula:
$$\text{Infectivity index} = \frac{\text{No. of cysts found at post-mortem}}{\% \text{ motility} \times \text{No. of eggs fed}}$$

Rabbits aged seven weeks and older are very much more resistant to infection with *T. pisiformis* than are those from four to seven weeks old.

S.W.

(36j) From experimental infections of six calves with *Cysticercus bovis* it appears that the masseters and head are not necessarily primary sites of election for the development of the cysts, that the state of degeneracy of the cysts in one part of the carcass is not necessarily

indicative of the state of cysts in other sites and that in generalized bovine cysticerciasis the sites of the cysts throughout the musculature are evenly distributed. The highest percentages of cysticerciasis reported in the United Kingdom have been from abattoirs where incisions into the heart are regularly made and at one abattoir over 40% of the cases diagnosed during the last six years have been solely as a result of heart incision. s.w.

(36k) Livers of rabbits which survived infection with moderate doses of *Taenia pisiformis* were reddish-brown in colour and contained whitish fibrosed areas where migrating larvae had destroyed the parenchyma: livers of rabbits which succumbed to similar infections appeared white or yellowish with some haemorrhagic spots. It is suggested that the appearance of the latter may have been caused by vascular dysfunction resulting from impaction of larvae in the portal and hepatic systems, although the microscopic appearance indicated that the interference with the blood supply resulted from the occlusion of the capillaries by swollen polygonal cells. The pathogenic effect may be associated with the secretions of migrating larvae rather than with mechanical damage. s.w.

(36l) Ova of *Taenia pisiformis* and *T. saginata* in saline remained viable for 187 and 335 days respectively when stored at 4°C. but for only about 60 days at room temperature. In the absence of surface moisture they did not survive longer than 14 days irrespective of the relative humidity. In some ova changes in the cement substance occurred during the third or fourth month of storage. Oncospheres freed from their embryophores remained infective for 42 days when kept in saline at room temperature. Hexacanth embryos could be activated after keeping at 45°C. for four hours; at least ten minutes at 59°C. was required to inactivate taeniid ova. s.w.

(36m) Undiluted sera of rabbits infected with cysticerci or from uninfected rabbits older than seven weeks showed several reactions to activated hexacanth embryos. Dilution with saline (1:4) eliminated the non-specific reactions and the enveloping body precipitate remained as the specific serum reaction associated with cysticerciasis: it occurred in dilutions up to 1:64 depending on the degree of infection of the host. Cross reactions in calf and rabbit sera did occur to either species of hexacanth although the highest dilutions at which heterologous embryos and sera reacted were lower than when they were homologous. Positive reactions at titres of 1:16 to 1:32 were detected in rabbit sera 14 days and in calf sera 10 days after infection. s.w.

(36n) Maneely demonstrated histological preparations of several invertebrates, including *Ascaris lumbricoides* and *Fasciola hepatica*, which had been embedded in Nonex 63B. This technique obviates much of the shrinkage and distortion caused by dehydration in alcohols and the high temperatures necessary for embedding in paraffin wax. After fixation the tissue is washed, taken through ascending grades of polyethylene glycol 900 in water (two to three hours in each for small pieces of tissue), passed to pure molten polyethylene glycol and incubated at 39°C. for 12 hours (or longer if necessary). It is then passed through ascending grades of Nonex 63B in polyethylene glycol 900 at 39°C. and immersed in pure molten nonex for 24 hours or more. After this the tissue is embedded in fresh molten nonex and allowed to cool at room temperature. Sections are cut in the usual way, floated on Lyle's golden syrup on warmed slides, dried in an incubator, dehydrated rapidly in absolute alcohol, dipped in 2% celloidin and dried in air. The slides can then be taken down through graded alcohols to water, stained, dehydrated in alcohol, cleared in a mixture of 40 c.c. creosote, 30 c.c. bergamot oil, 20 c.c. xylol and 10 c.c. organum oil, and mounted in Canada balsam. s.w.

(36o) Wilson describes, tabulates and illustrates with coloured plates the differences in appearance of microfilariae of *Wuchereria bancrofti* and *W. malayi* in thick blood films stained with Giemsa. *W. bancrofti* appears longer than *W. malayi* and has smooth flowing curves whereas *W. malayi* is usually much twisted with secondary kinks; the sheath of *W. malayi* readily stains bright pink and the nuclei are smudged and overlapping and stain dark purple;

the sheath of *W. bancrofti* is seldom visible and the nuclei are discrete and stain blue; the anal pore is usually distinct in *W. malayi* but seldom visible in *W. bancrofti*; the tail of *W. malayi* is often coiled under the body but that of *W. bancrofti* is usually visible; the proportions of the cephalic space differ. He emphasizes that appearances are greatly affected by method of preparation and that a description of technique must accompany any description of the appearance of microfilariae. s.w.

(36p) McCarthy & Fitzgerald briefly describe the pattern of life of men, women and children in Western Samoa and the various environments which result from the siting of villages. These may be grouped under five headings, the village itself (coastal or inland), the village environs, the plantations, the sea and its beaches and reefs, and the territory as a whole. The incidence of microfilariae and of manifestations of filarial disease according to sex, age and habitat is discussed. Differences in working and clothing habits and in environment are believed to be responsible for the difference in incidence in men and women. Infection and reinfection occur mainly in plantation areas and along bush paths leading to water points, etc. Although microfilarial counts vary greatly between individuals and in successive samples from the same individual the average count per positive case for each age group can provide useful information on the intensity of transmission and on changes of endemicity in a locality. It is suggested that a certain minimum parasite load must be maintained for a few years before major physical signs of disease become apparent; in Western Samoa this seems to be about 60 microfilariae per 20 cu. mm. blood which, if maintained, causes the development of hydrocele in men after about five years and elephantiasis after ten years. s.w.

(36q) McCarthy has studied the density of microfilariae of *Wuchereria bancrofti* in the peripheral blood at three-hourly intervals between 6 a.m. and 9 p.m. The observations were made on 23 infected prisoners in Western Samoa. The average numbers per 20 cu. mm. of blood were: 6 a.m., 28; 9 a.m., 28; 12 p.m., 95; 3 p.m., 115; 6 p.m., 110; 9 p.m., 76. He believes that the increase in the afternoon is not a true periodicity but is due to the physiological reactions of the host. Many of the larvae, particularly in the afternoon samples, were not completely extended and it is possible that these correspond to the stumpy forms described by O'Connor which he considered to be young forms. A marked increase in the numbers of these forms occurred between noon and 3 p.m. and this is believed to be correlated with the emptying of the lymphatic system into the blood. s.w.

(36r) Robinson found that there was no difference in the activity and behaviour of adult *Schistosoma mansoni* maintained for three weeks in horse serum, in the serum of heavily and repeatedly infected baboons (*Papio hamadryas*) and in the serum of uninfected baboons. It is suggested that in view of the fact that the animals are undoubtedly able to kill off adult worms they do so slowly and more than three weeks may be needed before any effect can be observed, if indeed it can occur *in vitro*. Immune sera were strongly positive to the circumoval precipitate reaction of Oliver-González but no precipitates were seen around adult worms. 21-day-old schistosomulae maintained in immune serum showed precipitates in and on the oral sucker generally within 24 hours; controls were negative. Globules appeared on the body wall of the schistosomulae in both immune and control sera. The significance and validity of these findings is still under investigation. D.L.H.R.

(36s) Four photomicrographs illustrate a case report of heart failure due to bilharzial lesions of the myocardium. There were no degenerative changes in the heart muscle but there was perivascularitis with mononuclear and eosinophil cells. R.T.L.

(36t) In laboratory-bred *Anopheles hyrcanus* var. *nigerrimus* fed on a patient showing microfilariae of *Wuchereria bancrofti* the intake of microfilariae and rate of development was practically the same as in the *Culex fatigans* fed at the same time. Both species had many infective larvae in the head and proboscis after twelve-and-a-half days. R.T.L.

37—Veterinary Medicine.

- a. KELLEY, G. W., OLSON, L. S. & GARWOOD, V., 1956.—“A field evaluation of ascaricides in swine.” 51 (3), 97-101.

(37a) Kelley *et al.* have made a comparative study of the efficacy of cadmium anthranilate, piperazine adipate, sodium fluoride, skim milk and Parvex (22% of betaine of 1-piperazine carbodithioic acid) against *Ascaris* in pigs. A total of 399 pigs between 60 lb. and 100 lb. in weight and kept on lucerne pasture was used, 135 being untreated controls. The drugs were given mixed with the dry feed and in the dosages recommended by the manufacturers. Ten pigs from each group were selected at random and treated as a representative sample for faecal egg counts. None of the mixtures appeared to be unpalatable and no toxic effects were observed. Sodium fluoride, piperazine adipate and Parvex reduced the egg count 99% in eight days at a cost per 100 lb. pig of 4 cents, 37 cents and 27 cents respectively. Cadmium anthranilate acted more slowly, reducing the egg count 98% within 21 days at a cost of 19 cents per pig. Skim milk showed a very low efficacy. S.W.

38—Veterinary Record.

- a. MILLER, W. C. & POYNTER, D., 1956.—“Hydatid cysts in a Thoroughbred mare.” 68 (3), 51-53.
- b. MICHEL, J. F., OLLERENSHAW, C. B. & ROSE, J. H., 1956.—“Helminths and husbandry—a fragment.” 68 (4), 79-81.
- c. SINCLAIR, K. B., 1956.—“*Echinococcus* infection in the fox.” [Correspondence.] 68 (5), 104.
- d. BAXTER, J. T., HARPER, W. O. & BELL, D., 1956.—“Hydatid disease.” [Correspondence.] 68 (5), 104.
- e. ADAMS, A. J., 1956.—“Hydatid cysts.” [Correspondence.] 68 (7), 130.
- f. HENDERSON, J. F., 1956.—“Hydatid cysts.” [Correspondence.] 68 (7), 130.
- g. CUNNINGHAM, M. P., JARRETT, W. F. H., MCINTYRE, W. I. M. & URQUHART, G. M., 1956.—“The carrier animal in bovine parasitic bronchitis: a knackery and farm survey.” 68 (9), 141-143.
- h. GORDON, H. McL., 1956.—“Tetrachlorethylene as an anthelmintic for sheep.” [Correspondence.] 68 (18), 271-272.
- i. GIBSON, T. E., 1956.—“Tetrachlorethylene as an anthelmintic for sheep.” [Correspondence.] 68 (19), 289-290.

(38b) “The intimate connection between husbandry and helminthiasis is recognised even by the helminthologist; yet this curious race of men does not yet appear prepared unreservedly to forswear the over-simplified simple formula; Do not be surprised at this, gentle reader; the helminthologist, like the elephant, the mole and the ungainly and ill-mannered wild boar, is what he is on account of the rigid restricting forces of his environment. Veterinary helminthology, a veritable Cinderella among the sciences, is largely confined to the laboratory. Is it surprising that the helminthologist should pause occasionally in his daily task, which is invariably concerned with the most unappetising materials, sit on his highly polished stool and dream?” [This is an extract, not an abstract.] R.T.L.

(38c) *Echinococcus granulosus* was found in five out of eight foxes killed in Cardiganshire early in 1955 and in one out of eight later in the year. Sinclair suggests the possibility that the most important intermediate host of *E. granulosus* is a small herbivore such as the rabbit or the hare, that infection of large animals is more or less accidental and that the outbreak of myxomatosis should be reflected in a reduction in the incidence of *E. granulosus* in foxes and, in turn, hydatid disease in other animals. R.T.L.

(38d) Seven out of 28 horses slaughtered for human consumption at a horse abattoir in Northern Ireland were found to have hydatid of the liver. R.T.L.

(38g) Continuing their survey on the incidence of *Dictyocaulus viviparus* two knackeries, one in central Scotland and the other in Ayrshire, were visited thrice weekly during the months January to May in 1955. About 1,542 unselected pairs of lungs were examined. In 181 or 12% of these lungworms were present. 452 were from stirks (i.e. young bovines which had completed their first season at grass) and of these 31% were infected as compared with 3.8%

of older age. As the high incidence in the young carriers was maintained in May when adults and calves go to pasture it is desirable to avoid turning young calves on to grass which has been grazed during the winter by stirks. A farm survey gave evidence that bovines may harbour lungworms for six months in the absence of reinfection. On several farms there were carriers although there was no history of husk for many years. Evidence was also obtained that those which had recovered from a severe attack of parasitic bronchitis had acquired a relatively high degree of immunity to reinfection and that most carriers were those which had not had a heavy infection and had not acquired a high degree of immunity. It is concluded from these observations that in the wet western districts the provision of clean grass for calves and susceptible adults is the only perfect remedy.

R.T.L.

(38h) Commenting on Gibson's view [for abstract see Helm. Abs. 24, No. 116a] that the administration of tetrachlorethylene in capsules to sheep without previously stimulating the oesophageal groove with copper sulphate is ineffective against *Trichostrongylus axei*, Gordon points out that the drug would almost certainly pass directly into the rumen and would therefore fail to exercise its anthelmintic effect. In Australian trials tetrachlorethylene is found to be reasonably effective against *Trichostrongylus* spp. when administered after copper sulphate if its effects are measured by egg counts made two or three weeks after treatment. The dose generally used for adult sheep in Australia is 7.5 ml. reduced proportionally to 2 ml. for lambs under four months old and mixed with equal parts of liquid paraffin or in an emulsion, but it must be preceded by 10 ml. to 20 ml. of a 5% solution or by swabbing the mouth with 10% copper sulphate solution.

R.T.L.

(38i) Tetrachlorethylene has no anthelmintic action in sheep in which prior administration of copper sulphate fails to stimulate the oesophageal groove reflex. As the action of copper sulphate is unreliable Gibson prefers to use phenothiazine. He mentions however that J. B. White considers tetrachlorethylene of value if shaken up with milk or tragacanth emulsion and preceded by copper sulphate.

R.T.L.

NON-PERIODICAL LITERATURE

- 39—DAVEY, T. H. & LIGHTBODY, W. P. H., 1956.—"The control of disease in the tropics. A handbook for medical practitioners." London: H. K. Lewis & Co. Ltd., x + 408 pp.
- 40—HOFFMAN, G. L., 1956.—"Medical parasitology laboratory manual." Minneapolis: Burgess Publishing Co., 98 pp.
- 41—UNITED STATES DEPARTMENT OF AGRICULTURE, 1956.—"Index-catalogue on medical and veterinary zoology. Supplement 5. Authors: A to Q." Washington, D.C.: U.S. Government Printing Office, pp. 971-1373.

BOOK REVIEW

- 42—LAPAGE, G., 1956.—"Veterinary parasitology." Edinburgh & London: Oliver Boyd, xvi + 964 pp.

This "Veterinary Parasitology", which deals chiefly with the parasites of British farm stock, is intended by the author to present to the reader a picture of each parasite not only in its zoological setting but also in its economic effect and on these grounds is addressed to the farmer and veterinarian, teachers of biology in schools and agricultural colleges and possibly to students of comparative pathology and public health. Due largely to the discursive style in which the material is treated the text extends to nearly one thousand pages, of which 330 pages are devoted to helminthology. This well illustrated and attractively presented volume should encourage the growing interest in parasitology and, save for its weight, could advantageously replace many a modern bedside book. But as there is no information on technique and as the diagnostic characters of the various genera and species are inadequate it cannot be recommended as a comprehensive work of reference to the serious student of helminthology.

R.T.L.

